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TELEPHONE ENGINEER

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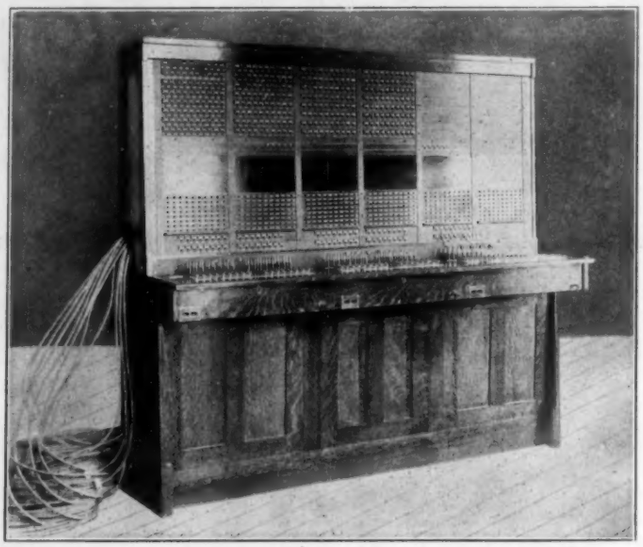

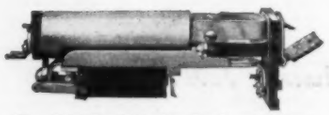

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C. W. HIGGINS, *Secretary*

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Making the Public Efficient

MOVED by the attempts of a depleted traffic department to handle an increasing volume of what he calls "superfluous telephone chatter," an eastern operating man proposes to eliminate such abuse of the telephone privilege, for which he says women are mainly responsible, and leave it to his operators to determine whether conversations are urgent or not. Like many other brilliant reform ideas, this one, we fear, is unworkable. It savors too much of censorship, of which it seems likely the dear people have already had enough. There are few telephone men who will not sympathize with the easterner, but still fewer who will rush to emulate his enterprise.

Since the function of the operating company is to give service, and service consists of supplying facilities for wire communication at a price, it is obvious that the nature of the conversations held, so long as they are not illegal, is none of the company's business, at least in time of peace. Exasperating and discouraging as it may be to know that the wires are tied up by useless gossip while valued business subscribers clamor for connections, technically the gossipers have as many and as valid rights as the business men. That we are all sorry this is so does not make it any the less true.

But while the company cannot safely censor conversations, it can, in most cases, dictate their duration. On measured service, at least, a definite time limit goes with the message rate. It is our observation that this rule is no rule at all in most exchanges. For the very reason that the great majority of conversations terminate in less than three minutes, the operators are inclined to be lenient with those who occasionally hold the line for longer periods. Now while it is by no means a safe standard, it is generally true that the important conversations are the brief ones, and that the users who insist on talking for ten or fifteen minutes at a stretch are the real gossipers.

A rigid enforcement of a three-minute limit per message, with an overtime charge for longer use, would work no hardship whatever on business subscribers. It would not stop all the excess gossiping, either, because some nonessential users would not be restrained by the extra charge; but it is reasonably certain that it would subtract a substantial percentage from the number of busy lines, and so reduce the number of operations required in a day to satisfy the wants of the calling subscribers.

Public Utilities and Public Speaking

A FEW years ago the only public speaking indulged in in the telephone business was at conventions, and that could not really be called public at all. Now, all of a sudden, we not only observe a general interest among telephone men in the idea of lecturing, but find a prepared series of addresses established for their use in talking to clubs and societies.

Mr. H. C. Blomeyer, president of the Texas Telephone Company and publicity worker for the Independent Association, has done as much as anybody to advance the art of talking in public about the telephone, with his illustrated address on rates. Many convention visitors at Atlanta realized the value of this new element of public relations for the first time when they heard his lecture. Now the Illinois Committee on Public Utility Information has gone a step further, and has prepared a series of "speakers' bulletins," patterned after those used by the well-known "four-minute men" during the war.

The idea of these bulletins is to encourage managers, employers, bankers and lawyers to talk authoritatively before public and semipublic gatherings of all sorts—commercial clubs, civic organizations, city councils, men's clubs, women's clubs, and so on—and to tell them what to say and how to say it. Naturally, they do not bear particularly upon the telephone or any other specific utility, but they do cover the general ground of public service in a highly effective way.

Undoubtedly this movement for fresh contact with the people, new to the telephone business, is one of the most valuable of all means of obtaining good will. Few will deny its efficacy in solving problems dependent upon public confidence, and even those telephone men who cannot, in their own organization, find anyone willing to undertake the task, will realize that it is well worth while to add, on occasion, a lecturer to the staff of workers.

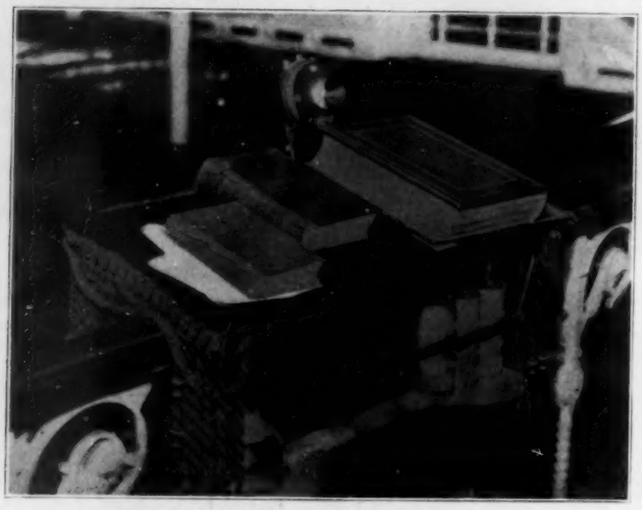


Photo by Underwood & Underwood.

Above are views of the pulpit in the Baptist Church at Penycas, Wales, and the bedchamber of Sam Pritchard, a miner injured by a fall of rock and now an invalid. Three of the cripple's friends installed a telephone transmitter in the pulpit, a head set and private line in the miner's home, and now he listens to divine service every Sunday.

Just to the right a Los Angeles girl is seen trying out one of the curious telephones used by General von Hindenburg of the German army for communication with Berlin. It was captured by an American doughboy in a raid on a dugout.

The picture just to the left, and the one below it show part of the telephone laboratory of the National Bureau of Standards, Washington, D. C. where both testing and research work are carried on. In the background of the upper view are telephone operators' line and cord circuits of modern type arranged for experimental and demonstration purposes. In the foreground may be seen some of the test equipment. In the lower view the two cabinets represent two automatic central offices, telephonically several miles apart. They are joined by means of the trunk repeater at the rear of the table and the artificial cable immediately in front of it. By means of the calling dial on the telephone and the automatic switching mechanism, communication may be had between the two telephones connected with the two "offices."

The lower right-hand picture shows a remarkable demonstration given recently at the Marconi headquarters in Chilmsford, England, at which a calling device invented to enable a ship in distress to ring alarm bells on other ships was put into practical operation before a group of scientists and engineers. Ordinarily a wireless operator is glued to his listening apparatus. When eating, or resting, the wireless is without observer and many messages and frequently calls for help are lost. Now the operator can be called up as easily as if he were on a telephone. The photo shows a visitor listening in the old way and on the left, an operator waiting to be called by bell.

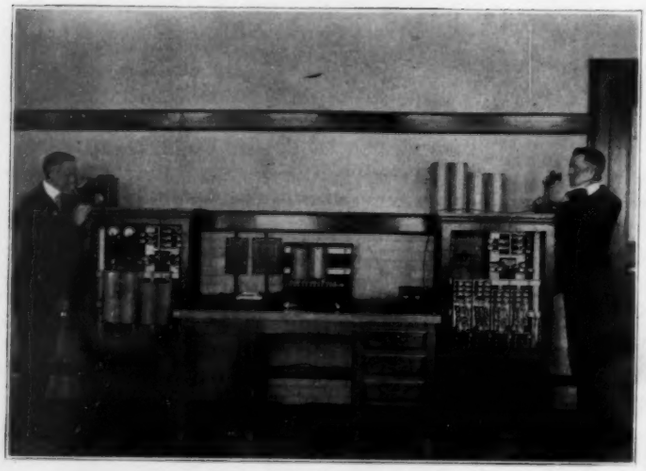


Photo by Underwood & Underwood.

Long-Distance Radio Talk With Small Power

One-Third Kilowatt Set Talks from New York to Topeka, Fifteen Hundred Miles

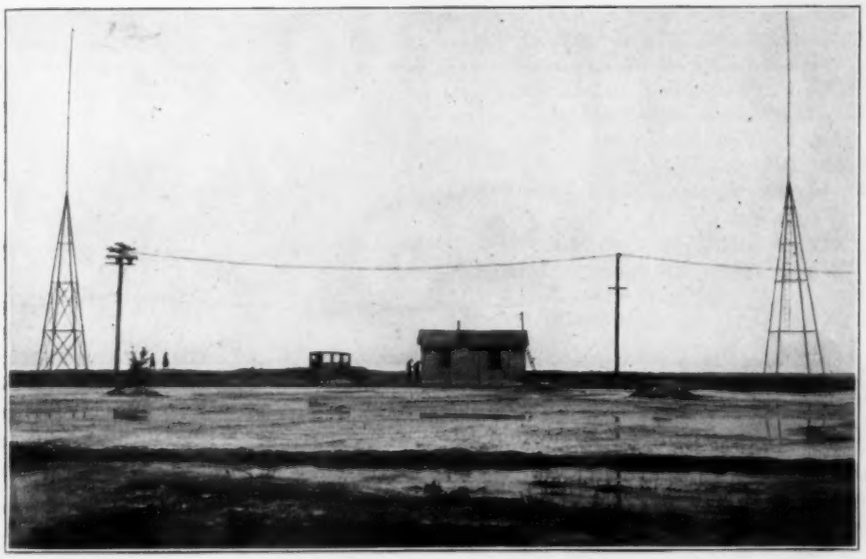
By MERLIN MOORE TAYLOR

GUGLIELMO MARCONI, the wireless expert, said in a moment of enthusiasm the other day that "within the year wireless telephones will supplant the present clumsy system with great economic advantage." This is taken to indicate that Mr. Marconi thinks that the wire plant, as part of a system of telephone communication, is soon to become a thing of the past. But is it?

"Central" need not worry over the possible loss of her job in the near future. She will be needed for a long time to come, even if the radio telephone does become the commercial possibility that recent experiments would indicate. Right now it would be possible to put the wireless telephone into practical use for long distance work in such cities as Chicago and New York, were it not for the expense of generating power. Even that is being overcome by nightly tests which have proved that it is possible to send the human voice through space as far as 1,500 miles with a generator that boasts only one-third of a kilowatt of power.

The De Forest Radio Company of New York has enlisted the aid of the half-million members of the American Radio Relay League in its experiments. Almost nightly tests are arranged whereby at specified hours in all parts of the United States operators sit with the receivers clamped to their ears, straining to hear the music of a phonograph being played in New York or the voice of a New York operator trying to reach them. Only one or two stations are equipped with the vacuum tubes which make it possible to send the human voice, so the results of the tests are reported by wireless telegraph, and later confirmed by mail.

R. H. G. Mathews, of Chicago Radio Laboratory, who has a conversation with Robert F. Gowen, inventor, of New York City, practically every night between 10 and 11 P. M. Mr. Gowen generally gives current New York news and follows this with music from his Victrola. Mathews hears signals of stations on both coasts, and from ships on the ocean and gulf as well as lakes. At times he can hear French and German stations.



Photos by International Film Service.

The Chicago Radio Laboratories at 5525 Sheridan Road, on the shore of Lake Michigan, where the wireless telephone waves sent out from the New York Station were first detected.

The tests began in February with Robert F. Gowen, engineer of the De Forest Company, on the New York end, and R. H. G. Mathews of Chicago, former United States navy instructor and vice-president of the American Radio Relay League, at the receivers in his laboratory on the banks of Lake Michigan in Chicago. Night after night, from ten o'clock until midnight, they worked in an effort to get in communication. Mathews meanwhile had notified his fellow members of what was being done and asked them to be on the alert. Various arrangements of amplifiers and coils were tried until finally, one night, Mathews caught Gowen's voice, low and hazy, but plain enough to distinguish the words.

tapped out on his radio key and Gowen sent back instructions for a change in the modulation. Mathews made them and listened again. Suddenly he got the right combination and others, standing around his instrument board, could plainly hear Gowen without the aid of receivers. Then the New York man put on a jazz record in a talking machine, and, had the Chicago station been large enough, a dance could have been held, so plain was the music.

The greatest surprise was yet to come. Gowen, elated over having made his voice heard in Chicago, 750 miles away, with a low-power generator, got letters proving that operators in Topeka, Kas., 1,500 miles away; Valley City, N. D.; Battle Creek, Mich., and Gaffney, S. C., also had heard him. They repeated the remarks he had made and named the tune he had played. Not only had he accomplished what he was trying to do, make himself heard 750 miles away, but he had sent his voice twice that far!

Wireless telephones as a success are not new. The navy used them during the war, the Department of the Interior has equipped its rangers in the forests of the west with small sets with a small range, in China the radio telephone is being used for communication between the cities and rural districts, and London and Rome have been holding successful communication. But to make the voice audible for hundreds of miles with only a small power generator is absolutely new and it is upon that the success of the wireless telephone hinges.

When a year ago United States navy operators, with President Wilson, Secretary Daniels and other notables as guests, sent the human voice around the world, a generator of 300-kilowatt power was used, a long wave length (something like 3,000 meters) was used, and it cost several thousand dollars to talk for only a few brief moments. With the low power generator in use, one of a third to a half-kilowatt power, and a wave length of around 360 meters the radio telephone becomes something within the reach of almost anyone interested in wireless.

Now as to what it means to the telephone companies. Use of the telephone for long-distance communication is more and more replacing the mails and the telegraph in business transactions. The number of trunk lines between cities necessarily is limited, and it is no unusual thing for a patron to be asked to wait two or more hours before his connection can be made, because there are so many calls ahead of him. With the radiophone there is no limit to the number of trunk lines, for the air is boundless.

When the telephone companies accept the wireless telephone with low power generators as a substitute for the wire system, it will be only the work of a few minutes to set up a long-distance connection. This does not mean that it is possible, or probable, that residences or business houses will at any time in the near future discard the present telephone for radio but it does mean that the telephone "central" can plug a patron in on an air trunk and tell him to go ahead and talk without waiting for one of the wires to become idle.

And the patron? He won't know, unless he is in touch with scientific developments, that his voice is being carried through the air instead of over a copper wire. He may notice that the voice of the man he is talking to is more clear and distinct than in the usual telephone conversation, and he may be aware of the fact that the clash and clatter in his ears are missing, but that is all.

An interesting experiment to prove that this is possible was staged at a convention of automotive engineers, who spent a day in Michigan, across the lake from Chicago. A motorboat, equipped with the wireless telephone, was sent out on the lake several miles. Then the operator got into communication with a radio switchboard set up for the benefit of the engineers in Michigan, was connected with a regular telephone, and the rest of the conversation was finished over the wires to a telephone in Chicago.

Interesting as all this is, the operator need not worry. The radiophone will not supplant the wire telephone during her lifetime. It will supplement it, just as the wireless telegraph is supplementary to the cable lines.

Just now a pocket-size wireless telephone is being made which will be able to establish communication with its companion apparatus at any time. Thus a business man can talk to his home or his office from any point he may happen to be, within the radius of his pocket instrument, if the notion seizes him.

England is far ahead of the United States in the development of the wireless telephone, because the government bought up the patent rights on such instruments and made them available to all experimenters. In the United States the patents are held by their inventors, and cannot be used without the payment of a stiff royalty.

The wireless station at Chelmsford, England, now is making efforts to establish communication by radio telephone with the United States without the use of great power. So far the attempt has been a failure, because the hour that best suits the British is not the most favorable for the American operators by reason of the great number of operators who are experimenting in the early hours of the evening.

Northeastern Indiana Has Good Meeting

The Northeastern Indiana Telephone Association held its annual meeting in Fort Wayne, February 17, with officials and managers present from all sections of the territory. At the opening session Frank E. Bohn, general manager of the Home Telephone and Telegraph Company, of Fort Wayne, delivered the address of welcome, and Max Hoea, secretary of the Indiana Telephone Association, of Indianapolis, gave a talk on reorganization and of service improvements.

The following officers were elected for the ensuing year: President, Senator W. E. Bowers, of New Haven, re-elected; vice president, A. R. Otis, of Kendallville; secretary-treasurer, Martin Umbach. A reorganization was also effected by the adoption of a new constitution and by-laws.

The afternoon program, beginning at 1 o'clock, began with an address on "Standards of Service," by Prof. R. V. Achatz, of Purdue University. Addresses were made by A. Smith, of the Central Union Telephone Company, of Indianapolis, and by Hon. Henry A. Barnhart, of Rochester, president of the Indiana Telephone Association.

These addresses were followed by a general discussion of plant and operating problems.

Telephone Chief Wants Gossip Prohibited

It is proposed by J. S. McCulloh, vice-president of the New York Telephone Company, that superfluous chatter over the telephone be eliminated. Women, Mr. McCulloh says, are the worst offenders. Operators will be instructed to determine whether conversations are urgent.

Pupin Attacks New Problems

Work of the Loading-Coil Inventor Described in the Scientific American

MORE than one enthusiastic patriot, writing on "America, the Land of Opportunity," has chosen to illustrate his contentions with a reference to Professor Pupin, of Columbia University, citing the undoubted facts that an ignorant immigrant of fifteen, coming from Serbia to the United States in 1874, became a member of the faculty of a great university in fifteen years and during his subsequent life in that institution, so wrought in science as to achieve both academic fame and great renown in the world of science.

This is all very true. Michael Idvorsky Pupin, who graduated from Columbia University in 1883, was an ignorant immigrant boy entering this country in 1874. But without in any way detracting from the stimulus of America as a "land of opportunity" it must nevertheless be stated that too few immigrant boys became distinguished men of science to allow America all the credit. If the young Pupin had not had an inexhaustible thirst for knowledge and determination and grit to carry him over and through a great many rough places in the road of learning, he would never have arrived at his destination at all, still less in so short a time.

Professor Pupin is distinctly a scientist, as opposed to an inventor, an engineer, a manufacturer. His interest is in knowledge for the sake of knowledge, in the pursuit of investigations for the love of unraveling complex problems. He makes no pretense of despising money or underestimating the good wrought by such inventions and discoveries as make the life of mankind easier, happier or better. But he does not attack a problem because it is being pressed for a solution by commercial or economic interests; it must be to him "a worth-while problem in science" before it engages his interest.

But with a full realization that the solution of many scientific problems has no immediate commercial application, Dr. Pupin believes that no knowledge which man can acquire is without some commercial value to someone, sometimes. "There is no worth-while, purely scientific problem, the correct solution of which will not some day have a practical value," he told the present scribe, and then illustrated his point with an interesting account of some of his own work.

The name Pupin is known in every laboratory in the world which devotes itself to the solution of electrical problems. His contributions to pure physics, especially in the field of electricity, are, many of them, foundations on which others build. Among these is the theory of selective tuning for the separation of mixed electrical oscillations. This theory was developed and completed by Professor Pupin in 1894, two years before Marconi startled the world with wireless. This theory, in the form of a patent, was sold to the Marconi company and by it used as the basis for selective tuning by which messages of different wave lengths could be received. Long before the wonder working vacuum-tube rectifier was brought out, Professor Pupin had developed the principle and apparatus for rectification of alternating electrical forces, which was succeeded later by the early crystal and vacuum-tube rectifiers of the radiotelegraph.

But the most spectacular instance which Professor Pupin quotes of the solution of a purely scientific problem proving of immense practical value, is in connection with what he himself regards as his most important contribution to both abstract and applied science. This is the formulation and demonstration of the theory of the propagation of electrical impulses over non-uniform electrical conductors. This is a fair mouthful of a title for a piece of work and without further explanation would have little meaning for the casual reader.

But consider for a moment the telephone. The first telephones were between house and house. Then they began to be between city and city. And the farther away the cities were the worse the telephone communication was. Many can remember the first "long distance" lines, when "long distance" and a hundred or so miles were synonymous terms. The buzzing, whirring, clicking, singing noises on the wire may have come from the "long distance" end of the telephone, but they were untranslatable into English. Telephone engineers attacked the problem from the telephone end; better telephones, better transmitters, better receivers, more sensitive instruments, was their idea. Professor Pupin, who had finished the work on his theory as a purely scientific problem, had little thought of its practical value until a friend, hearing this theory in a paper read before a scientific society, so urged and insisted that Professor Pupin obtain protection by patenting the idea, that he did so. Somewhat to his surprise and probably much to his disgust, he found that a telephone engineer, who had either heard or read the paper had already applied for a patent covering the same idea. However, Professor Pupin easily proved priority of invention and disclosure, and the "Pupin coil" as applied to telephony immediately came into use, extending telephonic communication from half a day's automobile run to a twenty-four-hour railroad journey.

The originator of the Pupin coil by no means cites only his own work as instance of discovery in pure science being inevitably useful to some one, some day, in a practical, commercial way. He speaks of Langley, a scientist for whom he had a great regard. Langley was laughed to death, dying of a broken heart when press and government alike ridiculed his experiments in mechanical flight. Congress refused the great scientist a second appropriation of fifty thousand dollars, after the failure of his first man-sized "aerdrome"; another Congress appropriated almost a billion dollars for the building of planes —airplanes, the deciding factor in the great war. Airplane builders today depend much upon Langley's fundamental investigations into aerodynamics and his "pure science" is made practical and commercially valuable in every plane that flies.

"Is it possible that Einstein's theory of relativity may have a commercial value?" the writer wondered aloud, after hearing this.

"There is no reason why not, simply because we do not see it now," responded Professor Pupin. "By the way, it is arrant nonsense to say that only twelve men in the world have mathematics enough to understand Einstein's theory. There are plenty

of scientists who understand it thoroughly. It appears now as if its greatest value was to come from the undoubted fact that it gives us our first glimpse of a possible clue to the understanding of the real nature of gravitation and the possible corroboration it affords for the theory that all matter is electrical in nature. Remember that the theory of gravitation is but two hundred years old—long for a man's life, short in terms of science. Yet here we are, two centuries after Newton, just getting a first small sight of a possible explanation of what it is. That exactly bears out my contention that all pure science may be useful some day; that no problem, no matter how abstract now, but may be of practical value tomorrow. People ask me if there is any prospect of solving the problem of unlocking the power in atoms, the power of the electrons, which travel nearly at the speed of light. We see no way at present; if I had a million dollars for experimental work, I wouldn't know how to begin to spend it on that problem. But the solution, if it ever comes, will in all probability come from some purely scientific theory, perhaps as unrelated to the subject of power as the theory of electrical impulses over complex conductors was unrelated to telephony when I worked upon it. Thousands of men may work for hundreds of years before one genius with the flash of inspiration arrives, who will unlock the door to endless power."

Professor Pupin takes out few patents—never until he is sure that what he wants to patent is of value. "I'd rather have a few good children than a lot of poor ones," he phrases it. He prefers to sell his patents outright, rather than to develop them commercially himself, because of a disinclination to be "bothered with business." He confesses, however, to a human pleasure when a patent of his results in practical value to an unscientific world.

Professor Pupin's present work is concerned with sound and its propagation, and an investigation into the difference between noise and musical vibrations. This, he believes, is a problem which has never been properly approached, nor in any way solved. The student of physics who has always supposed that musical notes were simple rythmical vibrations, while noises were complex mixed vibrations, is told that neither this nor differences in pitch nor loudness account for the difference in sound phenomena as between music and mere noise. "I rattle a bunch of keys and blow a penny whistle at the same time," says Professor Pupin, "as nearly as possible to make sounds of the same degree of intensity and loudness. You hear them both while close to me. But if I ask you to walk through my rooms, there comes a place where you hear the whistle quite well, but the keys no longer sound. The noise of a whistle on a peanut stand is drowned out by a passing elevated train which obliterates all other sounds, even those of heavy wagons, in themselves much louder than the whistle. But several blocks away you can hear the whistle and you cannot hear the noise of the trains. So I am working with sound and tubes in the laboratory and it may be that my work will be of interest not only to scientists"—Professor Pupin's eyes twinkled—"but to commerce, too. The investigation may open the way to the obliteration of noise in the phonograph—an essential of modern education—and to elimination of noise in the telephone."

Professor Pupin is also working on a new method of using dynamo current in place of storage battery current at telephone exchanges. Storage batteries are expensive to buy and maintain. Generators would be much more satisfactory if it were not for the fact that one hears them when their current is used for telephony. Professor Pupin does not discuss this as yet, but refers to it as a junction of sound and electrical experiments in the laboratory which may have an important bearing on the practical operation of the telephone exchange.

Professor Pupin's scientific work has been catholic in the extreme. He differed with the Edison interests in the early history of electricity in the commercial field, and advocated alternating currents instead of direct currents for general distribution. Time has proved him correct. He was first in this country to follow up Roentgen's discovery and the first X-ray photograph for surgical work was made by him in 1896. X-rays, however, and Professor Pupin's health did not get along well together and, preferring to be a healthy scientist to a badly burned X-ray-ist, he turned his attention to what became the "Pupin coil." He has made many other contributions to radiotelegraphy besides the theory of the receiving apparatus; an elimination of "static" is one of the problems to which he has devoted much time.

Professor Pupin is a mathematician of note, yet he refers to mathematics in his own hands merely as "tools." "Perhaps," he said, "if I had no laboratory, I would still attempt discovery in science only with a pencil and a sheet of paper; but there are so many other problems of more interest to me than the development of this tool that I leave it to others."

Perhaps the greatest work which Professor Pupin has done has never been patented, never put on paper, never formulated as a theory, never made evident to the public, nor is it likely to be. Columbia University has given Professor Pupin practically a free hand. He has as little irksome class room work to do as possible and his original work in the laboratory Columbia considers as of infinite worth to her as a university. But Professor Pupin's work in the laboratory which has perhaps done the world the most good is the work he has made others do—the development and instruction of many students, who have carried on work under him, the inspiration he has been to others and the influence he has had upon those who have begun their scientific careers in his classes. For Professor Pupin has the unusual combination of intellect raised to the nth power, plus a personality and a vividness of character which make him a power as a teacher. There is nothing "professional" about Pupin. He has balance, sanity, a sense of humor. If he looks at science scientifically, he looks at human beings humanely (which is not always easy to do). There is none of the pedantry of the pedagogue about him, and he is as gluttonous for work himself as he is for having his students work.

The Shouter

Here is a story with a moral for telephone users: Hon. James Duff, of Canada, was in the habit of shouting into the receiver, and one day Sir James Whitney, who was in his office nearby, asked what all the racket was about.

"It is Mr. Duff, sir," replied the clerk. "He is talking with his wife up in Simcoe county."

"He is, eh?" said Sir James. "Well, why on earth doesn't he telephone her, instead of yelling across the province like that?"—Boston *Transcript*.

Regulation of Service

Address Before the United States Independent Telephone Association at Atlanta

By HON. MURPHY CANDLER

Chairman of the Georgia Railroad Commission

THE telephone is no longer a toy or a luxury. It is even more than a convenience --it is a social and business necessity. What a marvelous growth it has had! The first time I ever got outside the state of Georgia it was my privilege to see the first public demonstration of the telephonic transmission of speech.

This was at the Centennial Exposition in 1876 at Philadelphia.

Forty years later I sat at a table in this city and in an ordinary tone of voice talked to the chairman of the California State Commission in San Francisco, three thousand miles distant. It is difficult to realize that in the span of my life—and I do not count myself an old man, nor does my wife—this science or art or whatever it is, has grown from a curious toy to a world-wide necessity.

In 1876 it was covered by one patent. There are more than 8,000 such patents today.

The National Census Bureau has just issued a bulletin of the results of the census of telephones in this country in 1917, and from this one can glean much intensely interesting information as to the development and growth of this business in which you are engaged.

There were more than 53,000 separate telephone systems and lines in the United States in 1917, operating nearly twenty-nine million miles of wire, connecting over twenty-one thousand exchanges and nearly twenty-nine million stations. The messages or talks over these wires in 1917 aggregated the stupendous total of nearly two billion, or at the rate of 211 messages or talks per annum for every man, woman and child in the country. The industry gave employment in 1917 to over a quarter of a million persons, more than 65 per cent of whom were women.

Salaries and wages for the year amounted to over one hundred and seventy-five million dollars. These employes operated plants and equipment valued at nearly one and a half billion dollars, which yielded revenues of approximately four hundred million dollars.

TELEPHONE HELPS GROWTH

I am glad that you are meeting in the very heart of the South, where possibly, as nowhere else in this country, the telephone—the small-town and rural lines—are proving factors of the largest importance in the development and growth of our farming sections.

Country life in the South has been more or less isolated. The sparseness of our white population and the lack of "next-door" neighbors has in the past, had a deterrent effect on agricultural development.

In the past, lack of good schools, good roads and means of neighborly communication have caused a large movement from our farms to the towns.

There is positive evidence that this movement is growing less, and this is due to better rural schools, improved roads, rural mail deliveries and rural telephones.

Th farmer is no longer isolated; his children have good schools; his market is accessible over good roads; his daily or weekly newspaper is brought to his gate; his wife can chat with her neighbor or call the doctor—these advantages now so universally enjoyed, the trend of population is back to the farm, with all its peace, contentment, health and uplifting environment.

THE GOAL IS SERVICE

Organized society cannot exist without inter-communication, and the quicker and more certain it is, the greater is the uplift of humanity in the intimate relations of social units. The highest social ideal today lies in the conception of the solidarity of the human race, and there is no more essentially physical instrumentality in bringing into reality this ideal than the telephone. Such reflections as these, gentlemen, must impress you with the dignity and vitally important service to which you have devoted yourselves and dedicated your property, and inspired in you a more determined purpose and consecrated effort to serve efficiently and adequately the great public of this country.

There is one great outstanding fact in connection with such business as yours. Some of you may not truly realize that the purpose of your creation as public service companies and the chief end of your existence is not *gain*, but *service*.

The last must come first and then may follow gain, but even then only reasonable gain.

If you render good service, then you have the right to claim a fair return upon the fair value of your property devoted to the public use.

As a public service commissioner I almost daily see evidences upon the part of some companies serving the public, of an entire misconception of their relations to the public.

Your first duty is to serve. Only then are you entitled to ask anything. I have often heard applications, where the executive of a public service company will admit poor service and insist that if the commission will give him higher rates he will improve his service. This man simply puts the cart ahead of the horse. Rates must be based on deeds, not on promises.

"Service first; compensation next," should be the motto of every public service company.

Within the terms of this motto are comprehended, alike, the duties of the public service company and the public service commission.

As I understand, one of the chief objects of the existence of the Railroad Commission of Georgia, having jurisdiction over telephone companies as well as railroads, is to help you render efficient and adequate service to the public upon fair and reasonable terms, and to all alike.

When you have done that you have discharged your public duties, but the commission is not through in every instance, when it has helped you to this extent.

Not all of the public know when a public service company has discharged its duties, and hence frequently make demands or complaints not founded on reason and justice. In such cases the Public Service Commission has a further duty; it is its duty to protect the public servant from these unreasonable demands and to assure it fair treatment.

PUBLIC USUALLY FAIR

My observation is that the great mass of the public is fair and wishes to deal fairly, though at times it is unreasonable, or errs through lack of

information. The fact that it is at times wrong in its demands or in its opposition to reasonable petitions of public service companies, in the past, has been largely the fault of the utilities. They have been too often secretive as to the results of their business and their true investments therein. They have been too often conducted on that old familiar theory of "the public be damned," and without due regard to the fact that the public created them, that it brought them into existence and endowed them with perpetual life, with valuable franchises, the right to exact tolls, to occupy and use public highways and to take private property by condemnation when necessary to serve the public, and, therefore, has the right to the fullest information as to how their servants have used their powers and with what individual gain therefrom. Given efficient service, supplied with correct information as to its cost, the public, generally, is willing to pay fair rates; but whether it be or not, it is the plain duty of a public service commission to authorize them.

The principles governing the making of rates are simple. The public is entitled to the highest standard of service, at a fair and reasonable charge. The public service company must furnish this character of service at a charge that will enable it to perform its duties to the public, maintain its property, and at the same time afford it a fair return upon the fair value of the property used in the service. Upon the one hand, the regulatory commission must protect the public from excessive charges, and on the other prescribe for the company fairly compensatory rates.

The rate-making commission in maintaining a delicate and even balance between these two poles of essential right has a great responsibility and a most difficult undertaking. The range of inquiry between excessive charge on the one side, and a fair return on the other is a no man's land, and whoever ventures there to adjust these delicate balances, whether court or commission, frequently returns bearing the scars of criticism and seldom the meed of praise.

To secure the best results and the most satisfactory relations there must be a trinity of co-operation between the company, the public and the commission, with open dealing, mutual confidence and the equal-handed justice.

RELATIONS GOOD IN GEORGIA

I do not know conditions in other states, but I do know something of them in Georgia.

Testifying from eleven years' experience on the Georgia commission, I know that the relations between the public and the telephone companies in this state have been, on the whole, more satisfactory than between any other class of public utilities. Their managements have been closer to the people and in very many instances entirely local.

I believe the best possible policy for a public service corporation is to get close to its patrons—know them personally, if possible, and place closest to them, in managerial positions, persons "to the manner born."

Place your very best men in positions of contact with the public.

Your company is going to be popular or unpopular; will be commended or damned, according to the impression made on the public by the character of the agents or employes you use in your daily dealings with the public.

Mighty few subscribers know or care who is the president of your company, but they know "Central," and if she is cross, they know it, and if they are cross she must know it.

A public service corporation is going to be judged by the character of its employes who come in daily, hourly contact with the public, according to their tact, courtesy, gentlemanly manners and good judgment. These traits in your employes are not only virtues; they are valuable assets, and will in the end appear on the credit side of your balance sheet.

My experience and observation, as a public service commissioner, has satisfied me that the good will of the public it serves is worth more to the utility than is the rate order of a commission.

Commissions can give you rates, but they cannot give you patronage, public sympathy and co-operation, without which rates are useless.

GOOD SERVICE WINS

Maximum rates and *minimum* service sometimes go hand in hand, but never far—the utility starves on this combination and the public rightly acts as grave digger instead of chief mourner.

I have been stressing good service as the forebear of fair rates.

There is another truth in connection with this question, and that is this: such service is almost altogether in your power alone and must be willing.

Commissions may pass orders requiring such service and try to compel it, but with years of observation I know, and you know, that compulsory service is never as efficient as voluntary service. Complaints will come anyhow, but when the utility honestly and persistently strives to serve and please, then commissions are fortified in seeing them treated fairly.

I believe in governmental regulation of public utilities. Most people do in these days. Fair regulation is in the interest of the utility. I believe this especially true as to telephone utilities. No other utility deals so intimately with the public. Your service is in the home as well as in the office and the storehouse. It is so frequent that there are literally millions of opportunities in a year for misunderstandings and differences, not from wilful neglect of duty upon the one part nor unreasonable demands upon the other, but just misunderstandings, and is it not better for the telephone company and better for its patrons that there should be in reach at all times an arbiter whose duty it is to reconcile differences, adjust misunderstandings and satisfy complaints? It appears to me that regulation is not only desirable, but that it is necessary if you and all your patrons are to have peace and contentment and good will.

We are living, gentlemen, under unusual conditions. The times seem out of joint. Discontent and unrest and revolution prevail through the world.

This spirit of unrest and fault-finding and criticism of everything and of every existing order prevails in our own country, and that, strange to note, after three years of the most patriotic sacrifice and service for country and humanity by practically all of our citizenship—our country seems to have descended from the inspiring heights of world service to the lowlands of selfish interests, with an almost overnight abandonment of the ideals for which we fought.

America cannot serve itself alone and fulfill its God-appointed destiny. Its vision of service should not be restricted by territorial boundary lines.

Such arts as yours, such service as you are rendering, more and more cement the solidarity of the human family by bringing into close contact widely separated social units.

Telephone Repeaters

Presented at a Joint Meeting of the American Institute of Electrical Engineers and the Institute of Radio Engineers—Concluded

By BANCROFT GHERARDI and F. B. JEWETT

THE preceding discussion has referred particularly to the operation of a single repeater in a circuit. Where several repeaters are used in tandem at different points in a circuit, the same considerations are involved. In addition there is the further consideration that not only can circulating currents be set up involving each repeater by itself, and which may lead to "howling" or to distortion in quality, but such circulating currents may follow paths involving any two or more of the repeaters operating in conjunction. As previously noted, the 22 type circuit involving artificial balancing lines has a large advantage over the 21 type for tandem operation, due to the fact that transmission entering it from either direction does not cause a large amount of energy to be thrown back in the same direction, as is the case with the 21 type circuit. There is thus very much less interaction between the repeaters with the 22 type.

Effective tandem operation of repeaters requires, therefore, a high degree of electrical uniformity, and also requires that the reflection effects between the repeaters and their connected lines shall be reduced as much as possible, so that each repeater brings in as little irregularity to its adjacent repeaters as possible.

Fig. 43.

THE FOUR-WIRE CIRCUIT

In the above we have considered the application of repeaters in ordinary circuits in which the same pair of wires is used for transmission east as is used for transmission west. After the above discussion regarding balance, it is evident that there would be considerable advantage in transmission if separate pairs of wires were used for transmission east and for transmission west. A circuit of this type, designated as a "four-wire circuit," is shown diagrammatically in figure 41.

The term "four-wire" does not mean necessarily that four wires are used for transmission east and transmission west. Each of these circuits may comprise a pair of wires, or may be a phantom circuit, etc. In a circuit of this kind there will be one-way repeaters in each of the two branches. The two branches must be brought together at the ends for connection to two-wire lines, or to the subscribers' loops. There is, therefore, a possibility for circulating currents to be set up flowing over the two sides of the circuit in series. In order to minimize such circulating currents, artificial balancing lines are used at the points where the four-wire connects with the two-wire in a manner similar to the arrangement of the 22-type circuit. It should be noticed that if the total amplification of both branches of the four-wire in series is less than the total transmission equivalent, the circuit cannot "sing." If the balance at the ends is good, the gains may be even greater than the transmission losses without producing singing. As in the case of two-wire operation, however, large distortion may be brought into the circuit by the circulating currents even when the amplifications and balance are not such as to produce singing.

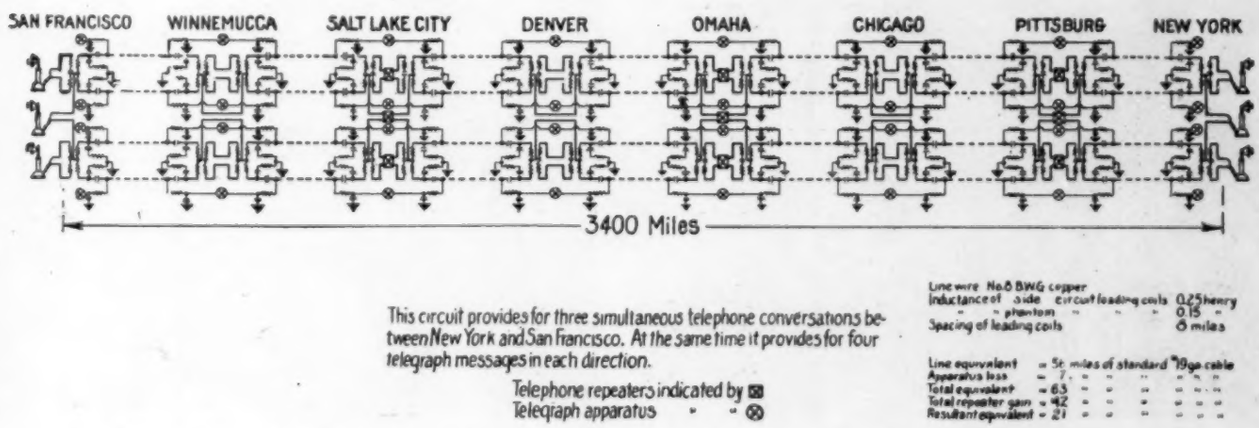

SAN FRANCISCO
WINNEMUCCA
SALT LAKE CITY
DENVER
OMAHA
CHICAGO
PITTSBURG
NEW YORK
3400 Miles
This circuit provides for three simultaneous telephone conversations between New York and San Francisco. At the same time it provides for four telegraph messages in each direction.
Telephone repeaters indicated by ⊠
Telegraph apparatus " " ⊗
Line wire No.8 BWG copper
Inductance of side circuit loading coils 0.25 henry
" " phantom " " " 0.15 "
Spacing of loading coils 8 miles
Line equivalent = 5[illegible] miles of standard 19 gauge cable
Apparatus loss = 7 " " " " " "
Total equivalent = 63 " " " " " "
Total repeater gain = 42 " " " " " "
Resultant equivalent = 21 " " " " " "

Fig. 42—New York-San Francisco Circuit. When Set Up for Through Telephone and Telegraph Circuit. Simplified Diagram.

Circuits of this kind evidently use twice as many wires as ordinary circuits. They permit, however, the use of smaller wires. It is a question of economics, then, as to whether a circuit of this kind proves in in any practical case. For long distance cable operation, and for other special cases,

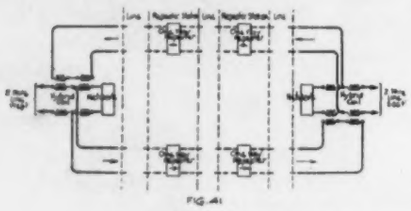


Fig. 41

there are conditions where we find that these four-wire circuits have a field of use.

METHOD OF APPLYING REPEATERS

In the practical operation of repeaters there are two methods of connecting them into lines which have come into general use. These are:

(a) "Through line repeaters."

(b) "Cord circuit repeaters."

The through line repeater is one which is associated with a particular line and connected directly into the line. The operators, therefore, have no control over it. It is generally set to give a definite amplification, depending on the characteristics of the line.

The cord circuit repeater is connected into a cord circuit under the control of an operator. The two ends of the circuit generally appear before the operator as two plugs which she may connect into any pair of circuits terminating before her which are in proper shape for repeater operation. The amplification given by the repeater is generally under her control, the amplification in each case depending on the pair of circuits which is connected together.

Where the circuits which may be used with a cord circuit repeater vary considerably in characteristics, so that the same artificial balancing lines will not work satisfactorily with all of them, various arrangements are used so that proper balancing lines will be connected into the circuit corresponding to the actual lines to which the circuit is connected. The commonest arrangement for doing this consists in having a jack in the switchboard immediately below each jack to which a toll line connects. This extra jack has connected to it an artificial line corresponding to the actual line. The repeater circuit then terminates in double plugs so arranged as to pick up both the actual and artificial lines simultaneously.

PRACTICAL RESULTS OBTAINED

As already noted, the amount of gain which may be obtained in any practical case now depends almost entirely on the degree of electrical "uniformity" which it is economical to maintain in the telephone circuits to which the repeaters are connected, since we can obtain within practical limits as large amplifications in the repeater elements as we desire.

We have already indicated the large effect which this electrical uniformity requirement has had on the design of loading coils, and on practice with regard to their use. About every feature of open wire and cable construction and office equipment which affects the electrical characteristics of the circuits has been in some way affected by this repeater requirement. Not only in the design and construction, but also in the daily operation and maintenance of circuits with repeaters, this requirement has to be kept constantly in mind.

At the present time more than 1,000 telephone repeaters are in service in the plant. We now will describe a number of typical repeater circuits and will indicate the results which are being obtained.

TRANSCONTINENTAL LINE

The circuit over which transmission is given between the cities along the eastern coast and the Pacific coast cities is shown diagrammatically in Fig. 42. Originally there were three repeaters used in this circuit, located at Pittsburgh, Omaha and Salt Lake City. Since that date, largely for flexibility in switching traffic, the number has been increased to six located at Pittsburgh, Chicago, Omaha, Denver, Salt Lake City and Winnemucca. The total gains were only slightly increased by the change. The circuit consists of No. 8 B. w. g. copper conductors loaded at eight-mile intervals with coils of one-fourth henry each. This gives a line equivalent of 56 miles of standard No. 19 gage cable. There is a further transmission loss due to composite and other apparatus of about 7 miles, the total equivalent being, therefore, about 63 miles. This is reduced by repeaters to a resultant equivalent of 21 miles, which is, therefore, about one-third of the equivalent without repeaters.

The drawing shows the important

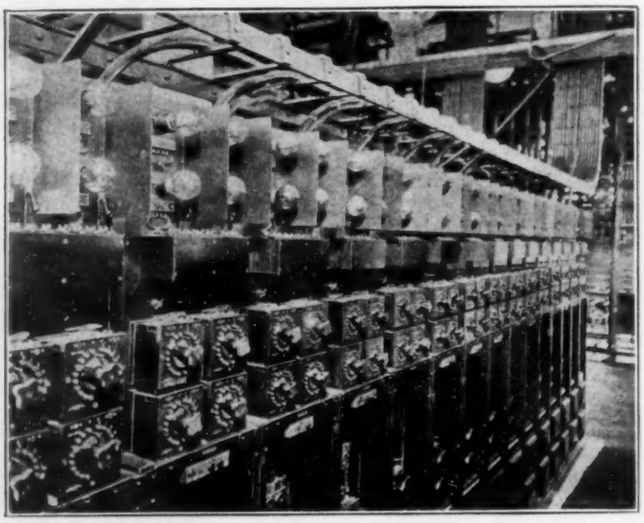


Fig. 44.

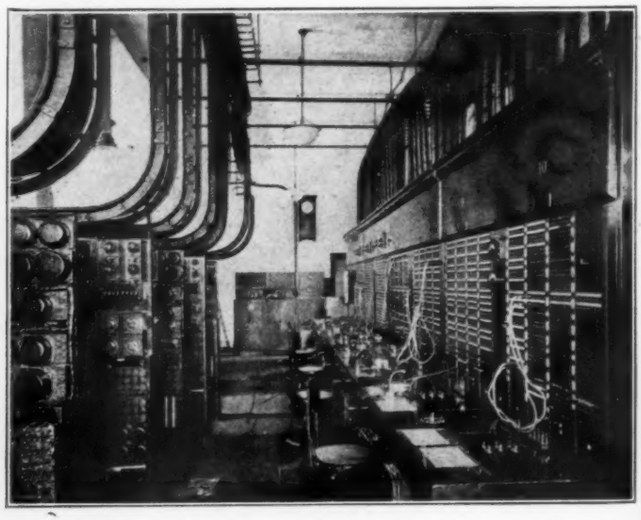


Fig. 45.

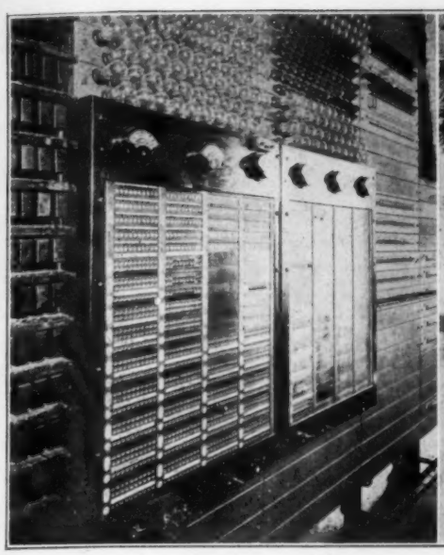


Fig. 46.

Fig. 47.

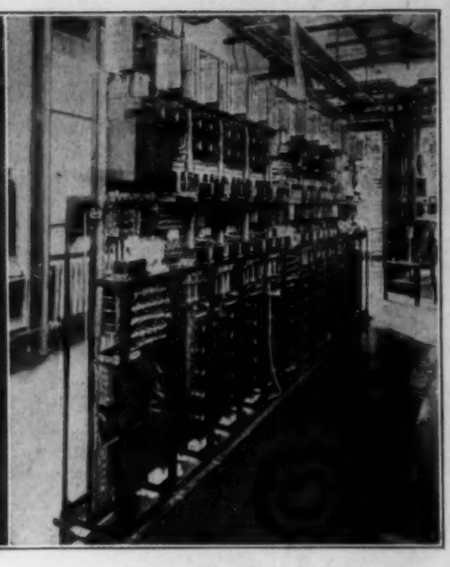


Fig. 48.

points on the line, indicates the positions of telephone and telegraph repeaters and indicates the compositing apparatus used in separating the telegraph and telephone currents.

BOSTON-WASHINGTON CABLE

The largest use of repeaters on cables has been in connection with the circuits between the various cities which are served through the underground cable route extending from Boston through Providence, Hartford, New Haven, New York, Philadelphia and Baltimore to Washington. The use of repeaters on small gage cables placed in this subway became of the greatest importance during the war in caring for the tremendously increased requirements for telephone facilities between these large cities along the Atlantic seaboard.

Most of these telephone repeaters are located in the large cities along the route of this cable. At two places, however, Princeton, N. J., and Elkton, Md., the repeater requirements were such as to justify the putting up of buildings especially for repeater operation. Fig. 43 shows an illustration of the building which was put up at Princeton. There are now about 200 repeaters working at Princeton. The ultimate capacity of the building will be over 500 repeaters.

Fig. 44 shows a typical group of repeater racks, each rack carrying two complete repeaters. Fig. 45 shows at the left front and back views of some of these repeater racks. At the right it shows the face of a test board from which the different repeaters and associated circuits may be tested. Fig. 46 shows the power board where the operating currents and potentials applied to the repeaters are measured.

The repeaters shown in the above photographs are of the vacuum tube type. Fig. 47 shows a front view of an installation of the mechanical type repeaters at Providence, R. I. Fig. 48 shows a rear view of the repeater racks.

The longest cable circuits set up along this route are those from Boston to Washington, a total distance of about 455 miles. A typical layout for a circuit of this kind consists of loaded conductors, No. 10 B. & S. gage from Boston to New York, No. 13 gage from New York to Philadelphia and No. 10 gage from Philadelphia to Washington. This circuit has an equivalent of about 30 miles of No. 19 gage standard cable, which by means of repeaters at Hartford and Philadelphia is reduced to about 14.5 miles. It should be noted here that No. 10 gage conductors are somewhat larger conductors than would now be placed for this business, and are being used because they were available, having been placed before the use of repeaters had been developed to their present effectiveness.

The longest circuits electrically, that is, those having the greatest attenuation, which have been operated with repeaters along this route, are New York-Washington circuits, consisting of No. 19 gage cable loaded with coils of about one-fourth henry inductance, spaced at intervals of about 1.16 miles. The distance is about 225 miles. This gives a line equivalent of about 62 miles standard cable. By the use of four repeaters at Princeton, Philadelphia, Elkton, and Baltimore, the equivalent of this circuit is reduced to about 13 miles of standard cable.

The above circuits make use of the 22-type repeaters. Where there is but one repeater in a circuit, however, the 21-type gives, under many conditions, satisfactory service. For example, between New York and Philadelphia, a distance of about 90 miles, a group of circuits is being worked on No. 19 gage conductors, with a single 21-type repeater at Princeton. The circuit without repeaters has an equivalent of about 24 miles of standard No. 19 gage cable. The repeater reduces this to about 14 miles.

SUMMARY

In the foregoing pages we have endeavored to present a short history of telephone repeater development, a statement of the factors which control their successful operation, an idea of the possibilities and limitations of different types of repeaters and repeater circuits, and three or four typical examples of the present commercial line combinations in which telephone repeaters are vital links in the every-day telephone service of the public. These, we believe, will give the members of the institute a fair picture of the state of the art as it now exists, both technically and commercially.

In concluding the paper it seems only necessary to add a word with

regard to the further influence which the telephone repeater is likely to have on telephonic communication in the future.

As indicated in the earlier parts of the paper, the net result of the vast amount of work already done has been to produce amplifying devices capable of taking energy from a local source or sources and under the control of enfeebled telephonic currents from a distant transmitting station deliver back into the telephone line currents which are faithful reproductions of these enfeebled control currents but with many times their energy. Furthermore, the work already done has developed the methods which permit of utilizing the amplifying properties of these repeaters in the various kinds of telephone lines which go to make up the modern telephone network and methods of constructing and maintaining lines to secure maximum efficiency and economy from the use of repeaters. The tools thus at our disposal are of such a character as to permit of our forecasting the changes which their use is likely to produce in the evolutionary growth of the telephone plant. When combined with the benefits to be derived from the loading of cable circuits, the use of the practically perfect repeaters now available puts an entirely different aspect on many of the problems which have confronted the telephone engineer in the past. Not only will there be the opportunity to utilize smaller gage wires than has hitherto been possible but the economical field for underground and overhead toll cables will be greatly extended into the region which it has heretofore been possible to serve only with some form of open wire construction. Viewed from the standpoint of continuity of service alone, this is an advantage of almost inestimable value. Further, the range of reliable and commercially possible long distance telephony will be very greatly extended.

Numerous fields which have in the past been fruitful regions of experimentation have likewise been made obsolete by the development of the telephone repeater. Most noteworthy of these is that looking to the production of powerful or so-called loud speaking transmitters. Many investigators have in the past devoted much effort to the production of this type of equipment and for many years a large group of telephone engineers, notably those in Europe, looked upon the production of a practical loud speaking transmitter as a key to the solution of long distance telephony. Comprehensive studies by the engineers of the Bell system early convinced us that the solution did not lie in this direction and the success of the telephone repeater is a vindication of the adequacy of these early studies and of the consistent line of development which followed them.

In conclusion, the authors wish to express their appreciation to Mr. E. H. Colpitts, assistant chief engineer of the Western Electric Company, Incorporated; Mr. O. B. Blackwell, transmission development engineer of the American Telephone and Telegraph Company; Mr. A. B. Clark, of the American Telephone and Telegraph Company, and Mr. H. E. Shreve and Mr. John Mills of the Western Electric Company, Incorporated, for the very great help they have rendered in the selection from a mass of information of the data for this paper and for their assistance in its preparation.

Indianapolis Merger Upheld By Court

Steps toward consummation of the merger of the Indianapolis Telephone Company's properties with the Central Union Company will be taken promptly as a result of the state supreme court ruling, affirming a Marion county court order for the merger, William Fortune, president of the Indianapolis Telephone Company, said.

The supreme court upheld a mandatory injunction of the lower court to compel the Central Union Company to execute its contract to purchase the Indianapolis Company's property. The court held that the city is no longer a party to the transaction, as its contractural powers in dealing with public utilities has been vested in the Indiana public service commission.

The public service commission has approved the contract between the two companies.

The city council had refused to approve the contract under which the Central Union Company assumed the burden of paying the city $6,000 annually for nineteen years in compliance with a franchise agreement between the city and the Indianapolis Company. The court finding raises some question as to whether the company will have to make the payments, even though it had agreed to do so.

Frank Wampler, vice-president of the Central Union Company, said that the attorneys for the company were examining the court's ruling and that no statement would be made for a few days.

It has been asserted by Central Union officials that the case was appealed to the supreme court only for the purpose of making sure the title to the property named in the contract would be good. The only point in question concerned the right to merge the two companies.

The price to be paid for the Indianapolis Company's property, according to the contract is $4,850,000. That includes payment for all property held by the company and its business "good will."

Preparations for Radio Across Atlantic

Wireless telephone communication between New York and London cannot be established until after peace is officially declared. This was definitely stated at the Marconi company's offices.

The cabled interview with Signor Marconi in London, in which the inventor of wireless was reported as saying that wireless telephone communication with New York would be shortly established, was shown to officers of the Marconi company. In the interview Mr. Marconi stated the cost would be 75 cents a minute for conversations.

David Sarnoff, one of the company's officers, said that the experiments referred to by Mr. Marconi were being made between the British Canadian stations. Extensive plans have been made for some time for the establishment of trans-Atlantic wireless telephone communication, to be inaugurated as soon as possible. These plans include radio exchanges which will transfer the voice from the ordinary land line telephone automatically. Under this arrangement it will be possible for a subscriber in New York to converse with a subscriber in London while using the ordinary telephone in the home office.

The Bear Lake, Mich., Telephone Company will move its wires to a parallel street in another block in the village, in order not to multilate a row of big shade trees through which the line has been running. The big limbs seriously affect the service.

A Community Chest Telephone Campaign

How Elyria's Automatic Plant Earned Credit for a Big Success

By E. J. HOWENSTINE

Secretary, the Elyria Chamber of Commerce, Elyria, Ohio

A COMMUNITY Chest Telephone Campaign to the average man would appear on the face of it to be a theoretical, idealistic idea, which would prove to be a complete failure when put to practical use.

The city of Elyria, Ohio, not only comes forth with this new and original idea, but in its big Community Chest drive in February proved that it was a most practical idea, establishing in the campaign world of today a new method which will undoubtedly revolutionize campaigning.

Prior to the opening of the campaign, the Elyria Telephone Company, which had been operating under the automatic telephone system for over a year to a marked degree of success, installed in the Chamber of Commerce rooms 26 separate lines with an extension for each line. This installation permitted each team the use of not less than two telephones. The extension was used by another member of the team in order to break in and assist in securing the subscription if necessary.

With the automatic telephone system, it was not necessary for the workers to call through a central operator, but they were permitted, with this system, to obtain an immediate and direct connection.

The success of the plan was due,

1st—To the automatic telephone system,

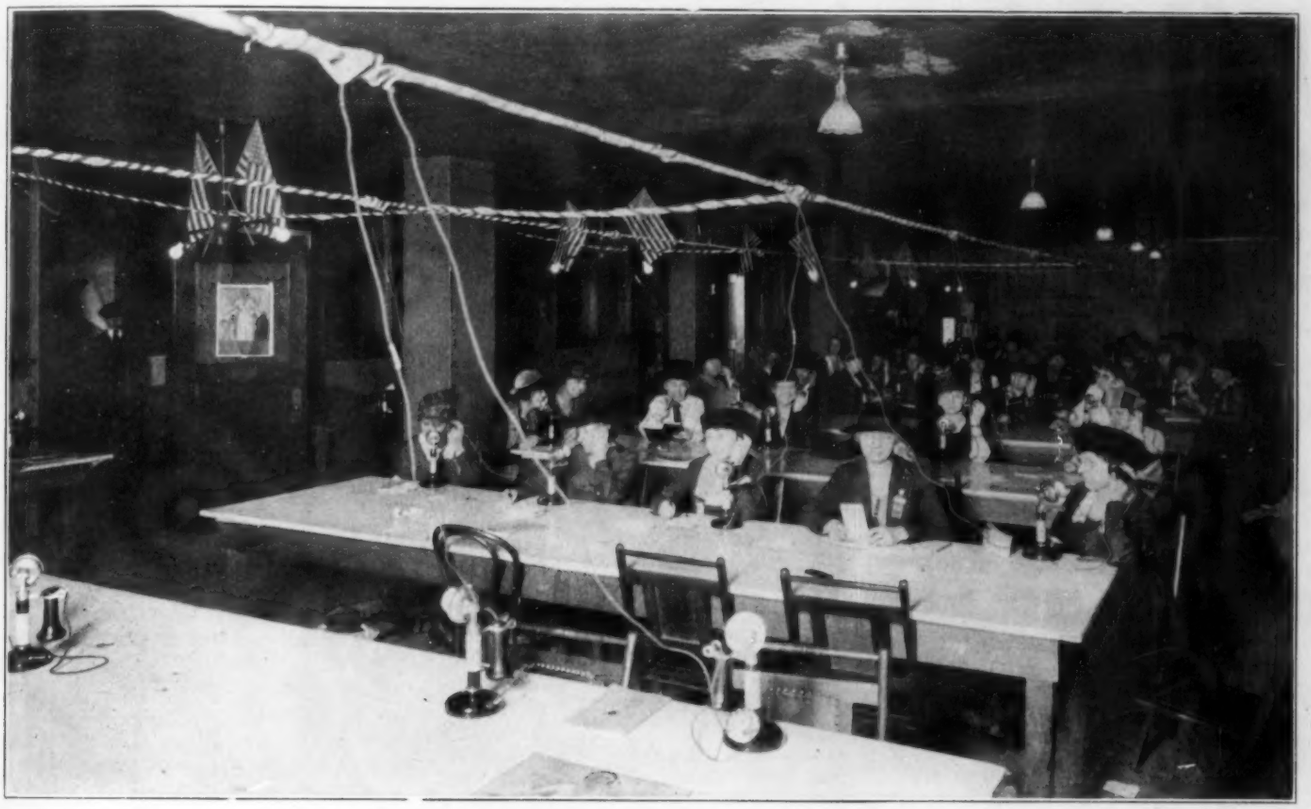
2nd—To the fact that all calls were made from a central point which did not permit the workers to become discouraged.

3rd—To the fact that it permitted a solicitor to reach scores of people, whereas under the old plan of personal solicitation, his number of prospects would be reduced to but a few.

The time which he sacrificed in this effort was between the hours of 5:30 P. M. and 8:00 P. M., which proved to be of little inconvenience to him in his business affairs.

The real success of the campaign is shown in the comparative figures:

In 1919 there were 700 subscribers with a total of $55,000.00 raised; in 1920, under the telephone plan, there were 3,700 subscribers with a total of $98,000.00 raised.



Rooms of the Chamber of Commerce of Elyria, Ohio, Equipped with 26 Automatic Telephones on 26 Separate Lines, and 26 Extensions. The Cables Were Strung Overhead and Wrapped with Bunting.

Four Hundred Miles of Wire for Fire Prevention

Four hundred miles of telephone lines are to be strung through the forests of upper Canada as part of the plan of the Ottawa River Forest Protective Association for prevention of forest fires. The decision to proceed with the construction of 200 miles of these lines immediately was reached at the annual meeting of the association.

Annual Report of the Bell System

Summary of President H. B. Thayer's Statement for the Year 1919

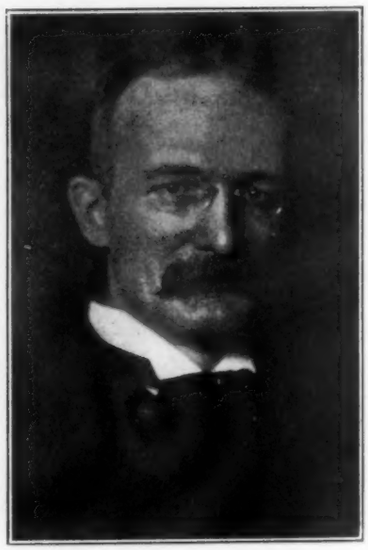
THAT the Bell system has passed through the strenuous period of war conditions with its plant, management and finances intact and is in a healthy condition to undertake its post-war responsibilities with a minimum of delay, is clearly shown by the annual report of the American Telephone and Telegraph Company.

H. B. Thayer, president of the company, gives an interesting history of the details and results of the year's operation not only of the American Telephone and Telegraph Company but of the whole Bell system. The system, although made up of many separate corporate entities, operates as one organization and enjoys the benefits of one organization —unity of purpose, standardization of material and methods, a single manufacturing, purchasing and supply department and a uniform policy. It is shown that there are advantages both to the stockholders and to the public in efficiency and economy of operation, in addition to the insurance value resulting from the national scope of the utility.

The report not only shows the component parts of the Bell system and their relationship to one another, but it describes how the system functions in order that each of the associated companies should get the greatest value from the headquarters organization with its accumulated experience and abundant resources. A statement of earnings for the five months' period since federal control is given more significance than the earnings for the complete year. In normal times the margin of undivided profits at the rate shown in the five months' statement would be considered ample. It compares favorably with any similar period in the system's history, but times are not normal and the commissions are asked to protect this necessary service by granting some increased rates so that the management may be prepared for some increased expenses.

Salaries and wages have been increased to meet the present standards and are believed to be generally fair and sufficient to attract the high class of personnel which is necessary to and has been characteristic of this service.

As in the past, the actions of rate



President H. B. Thayer.

controlling bodies have, in general, been acceptable. There are exceptions, as always, but the tendency is toward more equitable and more sound treatment. It is becoming more clearly understood that in a utility of this sort, which in order to give service must expand with the growth of the community, the test of rates—assuming economy and efficiency—is the return which will attract capital.

"No man and no corporation," says Mr. Thayer, "had a right to expect to come through the great war untouched. Our greatest loss was the loss of these margins for plant growth and reserves of men and women in training. During the war the restriction on the use of capital and material, coupled with the unprecedented demand for service, compelled us in some places to exhaust our plant margins and left us, at the beginning of 1919, with an actual shortage of plant to meet the then demands. By the end of the year, except in a few localities, the usual facilities were restored."

There is a heavy loss shown during the war in men and women trained for telephone work and in young men in the minor supervisory positions. "Handicapped by this lack of plant and of employes, especially supervisory officials, we entered upon the year of the greatest demands upon us," says the report. "Unavoidably, therefore, the service, particularly in congested centers, has been impaired. It is now improving, but it cannot be brought to the prewar standard until conditions approaching those before the war again obtain. To do as well as has been done, no body of men and women ever labored more loyally in the public service than have the thousands in this service during the past."

The report describes the functions of the Department of Operation, the Legal Department, Department of Development and Research, and the Department of Accounts and Finances, all of which are contributing to the development of the system so that it can meet the greatly increased demands that have been made upon it.

The Department of Operations, besides having direct charge of the long lines department of the company, now combines all the functions of the headquarters organization pertaining to the operation of the Bell Telephone System, its relations with the public, with other operating companies and with governmental and civic bodies.

In this department are:

Vice President Edward K. Hall, formerly vice president of one of the associated companies, who has charge of matters pertaining to general conditions of the personnel in the operating departments and who is chairman of the Benefit Fund Committee.

Vice President Eugene S. Wilson, formerly general counsel of a group of associated companies, who has charge of matters connected with revenue and the general policy of presentation of rate cases before rate-controlling bodies.

Chief Engineer Bancroft Gherardi, formerly engineer of plant of the company, in charge of the engineering department, is responsible for the preparation of the construction program, the technique of construction, maintenance and operation, and the calculation, classification and application of rates.

The Engineering Department advises the associated companies with reference to the most effective methods of applying to the telephone system the results of the work of the department of development and re-

search. It studies and advises on the plant, traffic and commercial problems constantly arising in the construction, operation and development of the system, and assists, by consulting engineering advice, on large and difficult or unusual engineering questions as they arise.

In plant work, the types of construction most economical under varying conditions and giving the best balance between investment and maintenance costs, are developed. Maintenance requirements for each type of plant are carefully studied. The most effective maintenance methods are determined for the associated companies, their results compared and new methods from time to time introduced making for improved service, greater economies or better arrangements of the working organizations to meet all conditions in the field. Accident prevention, which since the early days of the business has received careful attention, is continuously followed up, both as to the type of plant and the methods of working.

In traffic work, studies are made of the best methods of handling all classes of calls, of the most effective and economical use of forces, and of the best ways of giving efficient and economical service to meet the needs of the public. Standard operating and traffic engineering bulletins are issued to each associated company and its service and traffic work are carefully studied. Advice is given of any possible improvements, and as to the best method of meeting specific operating or other traffic difficulties, whether by the use of new or modified methods or by the improved application of existing methods.

In commercial work, telephone rates are being constantly studied not only to insure the necessary revenues, but also to do this by devising rate systems that, through the equitable apportionment of charges, will encourage the widest practicable use of telephone service by the public. This requires great care, under the complex operating conditions now encountered, if the rate plans are to permit the simplest operating methods and economy of plant and prevent misuse and congestion of facilities. The associated companies are assisted in making surveys of the commercial, industrial and social conditions that determine the present and future market for telephone service in the various cities. These surveys are made to determine the extent and direction of the use and growth of telephone service, in order that plans may be made for the economical and adequate extension of the plant.

Concrete illustrations of some of the engineering problems are given later under Plant and Service.

Through its various activities outlined above, and through their coordination, the engineering department is working constantly to give the public the most satisfactory and extensive service with economically designed, constructed and maintained plant, handled by traffic arrangements which are effective and economical, and with commercial rates and practices which will make the charges for the services as small as are consistent with paying proper wages to all employes and adequate returns to the investors. Without such returns satisfactory service cannot be rendered and the new money needed for extensions of the plant cannot be obtained.

The Legal Department, under Vice President N. T. Guernsey. The functions of the legal department remain unchanged. The department has been strengthened, particularly as to that part of the work having to do with patents. This has been made necessary by the number and great importance of the contributions to telephony and kindred arts by engineers and scientists.

The Department of Development and Research, under Vice President J. J. Carty, has for the same reason been segregated from engineering and made a separate department. The work of this department and its great value are well understood. Some of its more interesting activities during the past year are alluded to in the section on Development and Research.

The Department of Accounts and Finance, under Vice President W. S. Gifford, brings together the work of the comptroller and treasurer. Mr. Gifford has been with the Bell system since 1904, but on leave for the period of the war, during which he was director of the Council of National Defense.

In common with other businesses conducted on a large scale and over wide areas, standard accounting and statistical practices play a large part in the successful administration of the Bell system. Good accounting is vital to furnishing complex, constantly developing and nation-wide telephone service. The department of accounts and finance as a part of the central organization and hence acting for the associated companies collectively (as well as individually in special matters), develops the accounting and statistical methods in use throughout the Bell system. This function of the central organization insures uniformly correct accounting results under the basic system of accounts prescribed by the Interstate Commerce Commission; likewise it develops the most efficient and economical procedures for the handling and measuring of the millions of large and small transactions, many of an intricate character, which the associated companies encounter each month. These accounting and statistical services embrace the issuance of printed routines and other forms of advice which treat of all phases of telephone accounting principles and practices and of telephone statistics; origination of printed forms, reports and methods; dealings with the Interstate Commerce Commission (in all accounting and statistical matters); complete audits of the associated companies' general books of account and certification as to the honesty and accuracy of the companies' records and financial condition; cost investigations relative to telephone supplies, together with a wide range of related activities having to do with the new problems which continually present themselves.

The normal, steady increase in the need for exact knowledge of internal and external conditions affecting the operations of the Bell system, combined with the special need for careful analyses of the economic changes brought about by the war, have required a strengthening of the statistical organization. Special attention has been given in the year 1919 to the development of a statistical force equipped for financial and economic research.

Acting as it does for the Bell system collectively, the department of accounts and finance is enabled to employ a highly developed corps of specialists whose breadth of view and grasp of sound telephone accounting, statistical principles and practices and business economics give assurance of the integrity of the accounts as stated and of the statistics as developed, as well as of the efficiency of the processes by which the accounts and related data are built up. These accounting results and statistical presentations, from the initial summaries to the final form, are

of inestimable value in the administration of the business.

In the operating organizations of the system, that is, in the long lines department and the associated companies, there have been several changes during the year in the chief administrative positions, made necessary by death or retirement. The positions thus made vacant have been filled by promotions. As a whole the operating organizations have never been as strong in the higher administrative positions as they are now.

PLANT

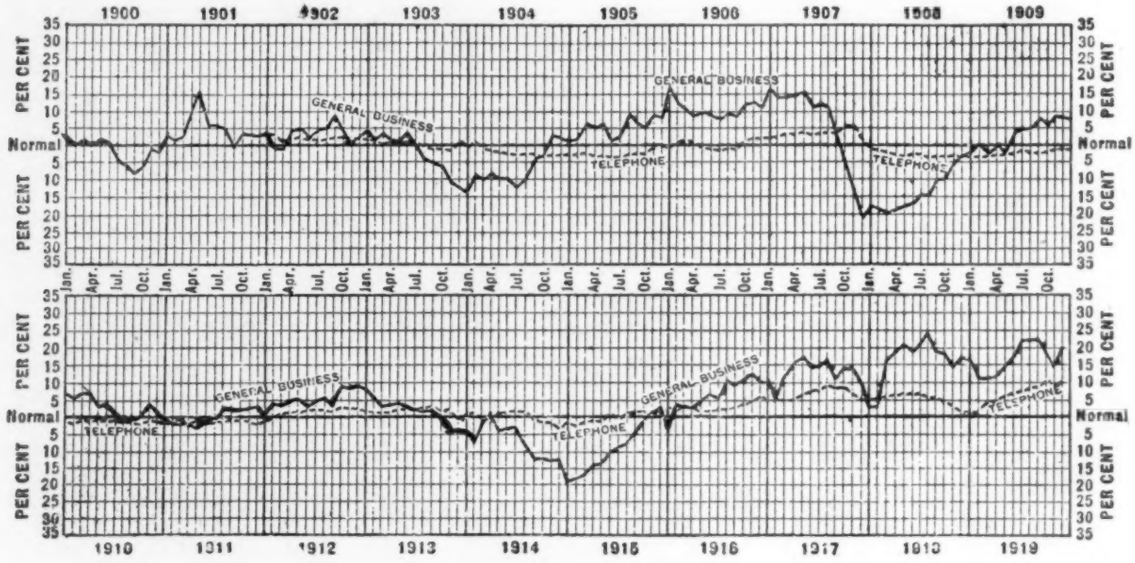
Maintenance: At all times, both during the period of federal control and since, the maintenance of the property has been adequate and in accordance with the standards of the Bell system, so that it has not been permitted to deteriorate, and today the physical property is in normal condition. During the war period and for a number of months thereafter, in the matter of apparatus adjustments and other minor troubles occurring from time to time on individual subscribers' lines or trunk lines and temporarily interfering with the service, it was not possible to remove these troubles as promptly as under pre-war conditions. These troubles, however, were always taken care of as promptly as possible and never permitted to accumulate, and the delay in removing them did not represent any deterioration of the plant, but merely indicated that the service was interrupted for a little longer period than under normal conditions. This delay in immediately removing difficulties of the character referred to above has been one of the minor causes contributing to the difficulty of giving our usual high grade service through the war period.

During the past year the damage to plant from sleet storms and other severe weather conditions has been somewhat less than the average. The necessary repairs have in each case been thoroughly made.

Additional Plant: While at all times the maintenance of the plant has been adequate, the war embargoes on all forms of telephone equipment and materials resulted in the using up of the normal margins of spare plant and equipment at many points, and the close of the war therefore found substantial shortages in many localities. With the lifting of the embargoes and the restoration of more normal conditions, steps were immediately taken to make up these shortages. Over and above these the intense commercial activity of the country during the past year and the consequent abnormal demand for additional telephone service made necessary a large amount of new construction. Under the direction of the engineering department plans already prepared were put into execution and additional plans were prepared and arrangements made for manufacture and installation, in order to provide the additional plant needed in the minimum time and to obtain the maximum efficiency from the plant already available. The results of this work are already reflected in the restoration of normal plant conditions in many sections of the country, and the general problem of relief will be solved as rapidly as possible.

Automatic Switchboards: During the past year the engineering department has been engaged in planning and directing the introduction of machine switching or automatic switchboards into the Bell system. It is the plan to study each improvement in apparatus to determine how it can most economically be made a part of the plant. Such studies show that in the large cities machine switching equipment should be employed for extensions necessary to provide for growth and for reconstruction to replace worn-out equipment. Our experience has shown that by this procedure we are enabled constantly to change to new types of apparatus as they are developed, with the least amount of disturbance to the service, in the minimum time and without disturbing effects upon the employes or on the financial situation. Thus loss and waste incident to sudden change are avoided, apparatus not sufficiently proven is not incorporated into the plant, and the entire physical property of the system is by easy evolution keeping abreast of the development of the art of telephony.

By the use of these automatic



A comparison of the telephone business and general business with estimated normal. The curve "General Business" is an estimate of general activity in terms of volume of business, i. e., with all price inflation eliminated. The "Telephone" curve is a measure only of the volume of telephone business, and not significant of financial results of operation.

switchboards, as it is planned to introduce them, increased capacity will be provided with proportionately small increases in the number of operators required and with a simplification of the service conditions in the large cities. While these automatic switchboards are more expensive in first cost than the manual switchboards, it is expected that the decreased operating expense of the automatic will do much to offset the increasing cost of giving telephone service.

Toll Cables: During 1919 the extension of the toll cable system from Philadelphia to Harrisburg was completed. Taken in combination with the cables already working between Boston and Washington, this gives a through toll cable route from the important points on the eastern seaboard to as far west as Harrisburg. Plans are completed and work is under way for the extension of this cable west from Harrisburg, and by the end of 1920 the toll cable system will reach as far west as Pittsburgh. The general plans have been completed for extending the cable from Pittsburgh to Chicago. If the demands for additional toll circuits continue, as seems likely at the present time, it is expected that this cable will be completed to Chicago by 1923. The installation of these toll cables results in economies over a period of years, due not only to the reduced annual charges on additional circuits as required and less expense for routine maintenance, but also to the fact that the losses resulting from storm damage to open wire are avoided, as are also losses in revenue and reaction on the service during storm periods. These new toll cables are therefore doing much to stabilize the toll plant and reduce expenditures, as well as further to improve the service.

Key West-Havana Telephone Cables: In co-operation with the Cuban-American Telephone and Telegraph Company, plans have been made for the extension of the telephone service of the United States across the Florida Straits by means of one or more telephone cables to be laid from Key West to Havana. The manufacturing arrangements for these cables and the new apparatus required in connection therewith are now in process. These cables will bring all of the principal places in the United States into telephonic communication with Havana and other important places in Cuba, and constitute an important extension of the telephone service of the Bell system.

Labor Saving Construction Machinery: Of special interest at this time because of the shortage of unskilled labor is the application of labor saving devices to telephone plant construction. Pole-hole digging and pole-setting machinery mounted on and using power from auto trucks has been tried out and is available for use. Many other mechanical labor saving devices are being constantly studied and adapted to the needs of the business.

SERVICE

The war and its after effects have produced marked reactions on the telephone service rendered by the Bell system. In every branch of business, including public service corporations, and in all home and domestic arrangements involving the employment of labor, these reactions have been serious, and from the nature of the case the telephone companies could not escape the country-wide tendencies at work. Good telephone service depends upon many factors, among which the principal are:

Adequate Telephone Plant: Unless there are sufficient switchboards and subscribers' trunk and toll lines to take care of the calls as they originate, the service is necessarily impaired both by the delay and by the effect on the operators upon whom this delayed traffic piles up. During the war adequate telephone plant could not be provided for growth. The government had to commandeer both materials and labor needed to build telephone plant, and divert them to the military establishments both here and abroad and to other purposes essential to the winning of the war. Since the armistice, much has been done in restoring the plant to normal conditions, but there has not been sufficient time to complete the work. It requires from eighteen to twenty-two months to engineer, build, install and cut into service a modern telephone central office, and if substantial building operations are involved, under present conditions, the time may extend to two or two and one-half years.

Adequate Traffic Supervisory Forces: Large traffic supervisory forces are necessary for the management of central offices, for the general supervision and direction of the work done in them, for the traffic engineering work and for other related traffic activities. This supervisory force was heavily drawn on during the war to furnish trained men to the Signal Corps of the Army, to the Navy, and to other war activities. In addition, much of the time and effort of the remaining supervisory forces were diverted to the special needs of telephone service for the government and war industries. While the work which these men did contributed in an important manner to the winning of the war, there was necessarily a reaction upon the general telephone service. These supervisory forces are now restored to their usual activities, and their efforts are showing results.

The Operators: It was impossible during the war to obtain an adequate supply of operators, and many experienced people left the telephone companies to enter the service of the government or the many industries which had to be created or greatly enlarged for the prosecution of the war. The difficulty in this matter became increasingly great toward the end of the war, and the situation was further complicated by the influenza epidemic and by the commercial activity which has resulted in a large growth of telephone traffic during the past year.

Among telephone operators there was a labor turnover of about 25,000 in the best pre-war year, 1915, and this rate was low in comparison with other large employers of labor. Under war conditions the labor turnover increased greatly in all industries, and among our operators it reached a rate of 80,000 a year. The adding of so many inexperienced people to the operating forces has reacted seriously on the service, particularly in the larger cities where it takes a long time for new employes to become expert. The turning point has been passed, and during 1919 the company added more people to the operating forces than were lost during that period.

The building up of the operating forces has been facilitated by the long established and well recognized policy of the companies of fair dealing with their employes and of providing for their comfort. The Bell system was a pioneer in providing the best buildings with not only every necessity, but every comfort for the operators, including ample quarters comfortably furnished, in which the operators can spend their time when not on duty, and dining rooms where

the best quality of food is provided at less than cost; in introducing a liberal plan for pensions, sickness and disability benefit payments; and in general in making every practicable provision for the safety, health and comfort of the employes. Wages have been increased to the greatest amount which the revenues would permit. While the cost of living and other factors vary in different places, telephone operators' wages generally are today higher in proportion to the cost of living than they were in 1915.

Every resource of the Bell system is being brought to bear upon the service problem. In all cases the falling off in the quality of telephone service has been stopped, in more than half the cities of the country the service has already been restored to normal, and with few exceptions an improvement has already been effected at the remaining places. It is clear from what has already been accomplished and from the increasing experience of the new operating forces that we may look forward during the year 1920 to a return to substantially normal service conditions throughout the Bell system.

EARNINGS

Whether the present rate of earnings is sufficient for present times and conditions is debatable. In the Bell Telephone system taken as a whole, more than in any other utility, profits are conserved within the system for the benefit of the public and the stockholders. There are intercompany profits on use of patents, on expert engineering advice, etc., and on manufactures, but either through the 4½ per cent payment or the dividends of the manufacturing company, these profits come into the treasury of the American Telephone and Telegraph Company, the financing company of the system. Except for the dividends on the small amount of stock of the associated companies in the hands of the public, all profits of the Bell Telephone system ultimately come to the treasury of the American Telephone and Telegraph Company, and all surplus over and above dividends is turned back into the system through investment in plant, particularly the long lines plant furnishing the intercommunication essential to universal service. Whether the total of the dividends paid is too much or too little is to be determined only by the market value of the shares and other securities of the American Telephone and Telegraph Company. The earnings must be enough to establish such market values as will make new shares or securities readily saleable.

There is a class of utilities which can give service by maintaining and operating without extending their plants. They can put such limits as they may elect upon the clientele they will serve. If a selfish public refuses remunerative rates, the reaction is only upon the utility as long as the plant is maintained and operated.

An essential part of telephone service is readiness to serve new patrons as well as old. Readiness to serve involves ability to extend and inability to extend means an insufficient service; and consequently, a reaction upon the public as well as upon the company.

Therefore, with telephone service more than any other utility, the necessity of earnings which will attract capital is a necessity of the public as well as of the utility. This principle is generally recognized. As a rule, we have found the public willing to pay fair rates and the rate-controlling bodies ready to authorize them.

DEVELOPMENT AND RESEARCH

The Department of Development and Research, during the past year, has actively prosecuted work upon more than five hundred improvements in the telephone art. All of these promise substantial advances in the character of the service it is possible to render, or large economies in construction and operation. Many of them have now reached the point where success is assured, as proved by practical tests or by commercial demonstrations on a large scale.

While for a number of years it has been practicable to talk by long-distance telephone between all of the principal centers of the United States, it has been desirable to improve the grade of speech transmission so that many small points tributary to those centers might be more satisfactorily included in the system of universal service.

A method of accomplishing this improvement has now been perfected, and is being applied to some of our most important long-distance lines. When it is generally installed, the long-distance transmission of speech throughout all parts of the United States will be very substantially improved, as may be illustrated by the case of the New York-San Francisco line. When this line is equipped according to the new method, it will be possible to carry on a conversation between New York and San Francisco as clearly and distinctly and with as much ease as it may be done at present between New York and Boston. Without the new method, this great improvement in the service would be impossible because of the prohibitive cost of the heavy construction which would otherwise be necessary.

For many years the mass of wires required in city and suburban telephone systems has necessitated the use of cables, both underground and overhead. The great expense of underground ducts and the cost of the cable itself, make it exceedingly desirable that as many conductors as possible be included in each cable. The improvement of telephone cables, therefore, is at all times the subject of study and experiment by our experts.

In previous reports, the development of cable containing as many as 1,800 and even 2,400 wires, was announced. The methods used in constructing these cables have already been adapted to cables of other types, and are being still further extended so that they will be applied to practically all telephone cables used in local service.

The savings in construction made possible in this way have already proved to be substantial, amounting to several millions of dollars. As time goes on, these savings are sure to increase.

With the improvements which have been made in long-distance telephony has come a great increase in the number of long-distance lines, and in the cities and suburban districts, long-distance wires, as well as local wires, must be placed in cables.

Cables in long-distance lines have always greatly limited the distance through which speech may be transmitted, but as the increase in the number of long-distance wires has made necessary the employment of increased lengths of long-distance cable, the technical difficulties presented in the transmission of speech through such circuits have seemed at times to be almost insurmountable.

Intensive development work has been applied, particularly during the last five years, to this cable problem. Each new long-distance cable that is constructed represents important improvements over what has gone before. Cables placed as late as 1916

contained circuits for long-distance transmission having 320 pounds of copper per mile of circuit. By means of cables which we have now developed, it is possible to give even better transmission over circuits having only 80 pounds of copper per mile of circuit.

This type of cable is now available for distances as great as a thousand miles. In cities it is placed in ducts underground, and in the country districts it is in general run on poles overhead.

At the time that the long-distance cable having a range of a thousand miles is being practically installed in the plant, the results of further research work assure still greater advances in the transmission of speech through cables. Experimental trials of this newest method have already demonstrated that a cable can be made two thousand miles long which will transmit speech satisfactorily over copper wires no heavier than those previously required in a cable only one thousand miles long.

Speech can be transmitted through two thousand miles of this new type of cable with its circuits weighing only 80 pounds a mile, as distinctly and as loudly as it is now transmitted through the heaviest gauge open wires strung on poles, which weigh 870 pounds to the mile of circuit. This type of cable, like all other types of long-distance cable, is applicable only where a large number of wires are required along heavy trunk line routes. In such situations, in due course, the new growth will be provided for in these cables, thus utilizing at greatly reduced cost a form of construction which practically guarantees continuity of service and high grade transmission regardless of weather conditions.

As time goes on, the savings which will result from the use of these cables will be enormous, amounting ten years hence, according to a very conservative estimate, to as much as $5,000,000 a year, not making any allowance for improvement of service, or lost business due to interruptions.

A most valuable part of these cable researches has consisted in adapting the new inventions to the existing plant of the company in such a way as to avoid the abandonment of cables already in service and in good physical condition. These cables, costing originally many millions of dollars, are to be continued in service. Instead of being rendered obsolete, their value is increased and their usefulness extended. In some cases cables already laid are so much improved that they will give excellent telephone transmission in circuits four times as long as when they were first put into use.

With the constant growth of the telephone plant, and with the spread of electric railway and electric light and power circuits throughout the country, have come problems of increasing complexity growing out of the tendency of electric railway and electric light and power circuits to produce disturbances in telephone lines. This requires on the part of our engineers even closer co-operation than in the past with the engineers of the electric companies. Frequently the interferences produced in the telephone are not caused by the currents actually needed for the operation of the power and electric light circuits, but are caused by currents which are incidentally produced by the power generators and are not essential to their operation. By co-operation with manufacturers and users of power apparatus, it is expected that improvements in the design of such machinery will be brought about which will greatly reduce this tendency to interrupt telephone service.

During the year important studies have been conducted throughout the United States in the territory of various of the associated companies, and recommendations have been made to those companies setting forth methods of overcoming numerous electrical disturbances from high power lines. Extensive investigations and tests have been made upon important electric railroad installations and valuable results have been obtained therefrom. Co-operation has been continued with the National Board of Fire Underwriters, with the United States Bureau of Standards, and in the preparation of the National Electrical Safety Code.

Great progress has also been made in subscribers' station and central office apparatus. Improvements, making both for economy and efficiency, have been perfected and standardized for use. Among these the most important is the machine switching system which has been the subject of constant study and experimentation by this Department over a period of more than ten years.

It has been necessary not only to produce apparatus which would operate efficiently and economically, but also to perfect all of the details necessary to make this entirely new apparatus function properly in relation to the existing apparatus, the present buildings, the practice of the public, etc. That is, after its completion as an efficient mechanism it was necessary to make all of the adaptations so that its introduction would be economical and without disturbances to the public. This has been accomplished.

RELATIONS WITH EMPLOYES

Except for a few isolated and perhaps inevitable instances the relations between the companies of the Bell system and their employes have, since the beginning of the business, been unusually cordial and intimate. Up to the beginning of the war this relationship had for years been a matter of favorable comment on the part of the public and a source of general pride and satisfaction to the managing officials and other employes generally.

This relationship was undoubtedly in part based upon the general policy of all the companies of establishing wages and working conditions as good as, and where possible, even better than those obtaining in comparable lines of employment. The policy of the various companies of paying the highest wages commensurate with the revenue obtained from the public was supplemented by surrounding the employes with the best possible working conditions and by providing through pensions, sickness and other benefits, a certain feeling of permanent tenure of employment and a consequent feeling of security. The entrance of this country into the war, the decimation of the ranks of the force by the contribution of many of our best people to military service, the abrupt increase in the cost of living, the impossibility of quickly increasing the companies' revenues through the prescribed channels of necessarily slow-moving governmental authority, all contributed to make it extremely difficult for the companies to carry out, during the past few years, the established policies of the pre-war period. In spite of the difficulties the companies have been able through successive wage increases generally to meet the increased costs of living on the part of the employes, and the public authorities have in nearly all instances been entirely fair in assisting the companies to carry out this program. As far as fundamental working conditions are concerned, the companies have been able to preserve

the pre-war standards at all times even during the trying conditions of the war.

During this period the officers of the companies have been impressed, however, with the desirability of the adoption of some practical plan which would assure a closer and more informal contact between the managing officials and the other employes than is readily afforded by the regular channels of administrative organization. In these abnormal times when new problems are continually being presented not only to every department of the company but to every individual employe, as well as to every managing official, it has seemed more than ever essential to formulate some plan which would give to the management of the companies a more intimate knowledge and appreciation of the personal problems of the individual employe, his relation to the company's organization and his contribution to its success, and which would give to the employes generally a clearer and more general understanding of the policies and principles governing the administration of the business. It has been deemed wise to go further than this and give to those employes who desired it, an opportunity to discuss collectively as well as individually, their relation to the business.

Accordingly, shortly before the properties were turned back by the government a suggestion was made to the associated companies that they invite their employes to form committees or associations through the medium of which the managing officials and employes might deal directly in connection with matters affecting their common interests and the performance of the public service. This suggestion has been widely accepted and committees or associations of employes have been quite generally formed in companies where they did not already exist. That the suggestion has been accepted in the same spirit in which it was made is well illustrated by the following preamble and statement of purposes appearing in the constitution of one of these associations:

The employes of ..... Company, recognizing the important and unusual obligation of themselves and of the company to the public which they serve, and realizing that their interests and those of the management are mutual in the conduct of the operation of the company, hereby form an association which shall be governed by this constitution.

The purpose of this association shall be:

(*a*) To maintain a spirit of mutal cooperation and confidence by providing regular facilities for the exchange of views and suggestions between the employes and the management.

(*b*) To supplement the right of each employe to deal directly with his superior officers by affording the employes collectively a voice in matters pertaining to working conditions, compensation, hours of labor, safety, efficiency, education and other matters of mutual interest.

While it is yet too early to make any comment upon the new relationship which is being established through these associations or committees, it is believed that they cannot fail to strengthen the confidence and mutual understanding between the officers and employes of the various companies.

It is believed that the new relationship between employes and management will bring to both a keener feeling of mutual responsibility and a more intimate sense of the absolute necessity for mutual participation in the carrying out of the duties of the organization and in the rendering of the great civic service which is involved in the telephone business.

There were 15,000 telephone men in war service from the Bell system, and practically all who have applied for reinstatement have been re-employed.

The total amounts of payment under Employes' Benefit Plan for pensions, sickness, accidents and death benefits during 1919 was $2,855,008.

During the period of government control increased costs and uncertainty as to the authority of the government to fix rates resulted in failure of the government to earn its compensation. After the return of the properties to the owners a satisfactory adjustment was made with the postmaster general. At the end of the year the report shows that in the United States there were approximately 11,000 separate telephone companies. Of them 36 are associated companies of the Bell system, 9,403 Independent companies whose telephone stations are connected with the Bell system and about 1,500 Independent companies whose telephone stations are not connected with the Bell system. There are also a large number of rural lines and associations operated mainly on a mutual or co-operative basis and not rated as companies. Of these lines and associations there are 26,184 which connect with the Bell system.

At the end of the year the number of telephone stations which constitute the Bell system in the United States was 11,795,747, of which 7,739,159 were owned by associated companies of the Bell system. The increase in the total number of stations in the Bell system during 1919 amounted to 729,748.

There were 209,860 employes in the associated Bell companies at the end of the year, who are operating 24,162,999 miles of wire of which 94.6 per cent was copper. The net additions to the Bell-owned plant during the year was over $73,000,000.

For the whole Bell system with all duplications excluded the total income, including compensation, after the deduction of expenses amounted to $79,650,186, from which over $27,000,000 was paid in interest and $39,000,000 in dividends, leaving over $12,000,000 surplus. The surplus earnings in the last five months of the year since the end of Federal control have been $7,000,000.

The capital stock, bonds and notes payable of the Bell telephone system outstanding in the hands of the public at the close of the year were $1,060,000,000, while the net assets devoted to earning return on these outstanding securities amounted to over $1,448,500,000. This is due to the fact that surplus and reserves of over $388,500,000 had been invested in productive property.

For the American Telephone and Telegraph Company the net earnings of the year were over $60,000,000. In round figures, the interest charges were $15,000,000, the dividends $35,000,000 and the resulting balance $9,000,000, of which $5,000,000 was appropriated to Reserve for Contingencies and $4,000,000 added to Surplus. The company and its predecessors have paid dividends to the public at the rate of at least $7.50 per share each year for the past 38 years, and during the past 13 years the rate has been uniformly $8.00 per share. The number of shareholders in the American Telephone and Telegraph Company was on December 31st 120,460, an increase of 8,000 during the year. To this number should be added some 9,000 employes of the Bell system who are paying for stock out of their wages. More than 19,000 employes have already paid in full for their stock and are stockholders of record. There are more women stockholders than men.

Pictures of the Home Telephone and Telegraph Company, Fort Wayne, Indiana

View of "South" Exchange, Fort Wayne.

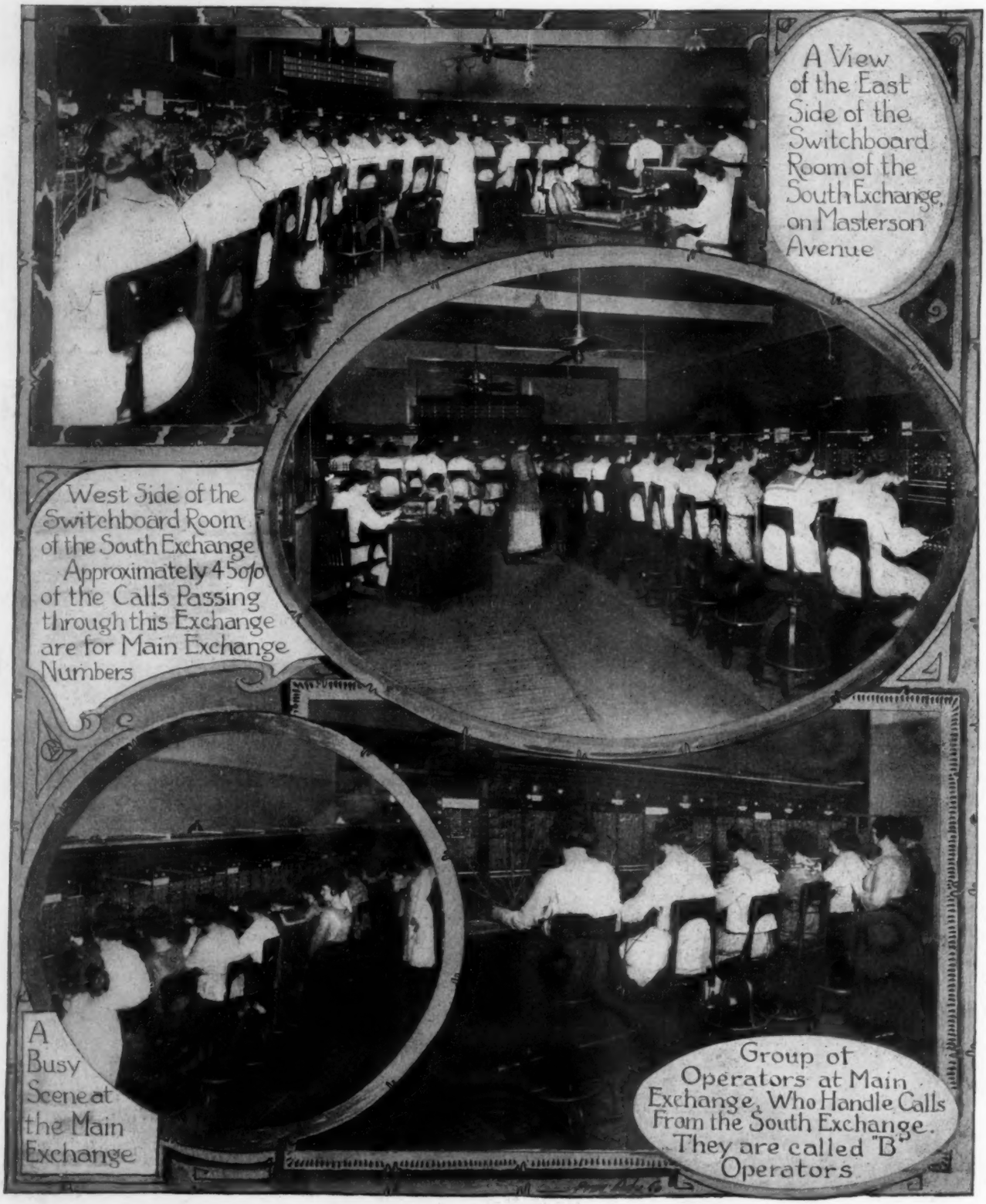
"Main" Office, Fort Wayne; Building at Right Purchased for Overflow.

Company Warehouse and Garage at Fort Wayne, with Capacity for 30 Cars in Basement.

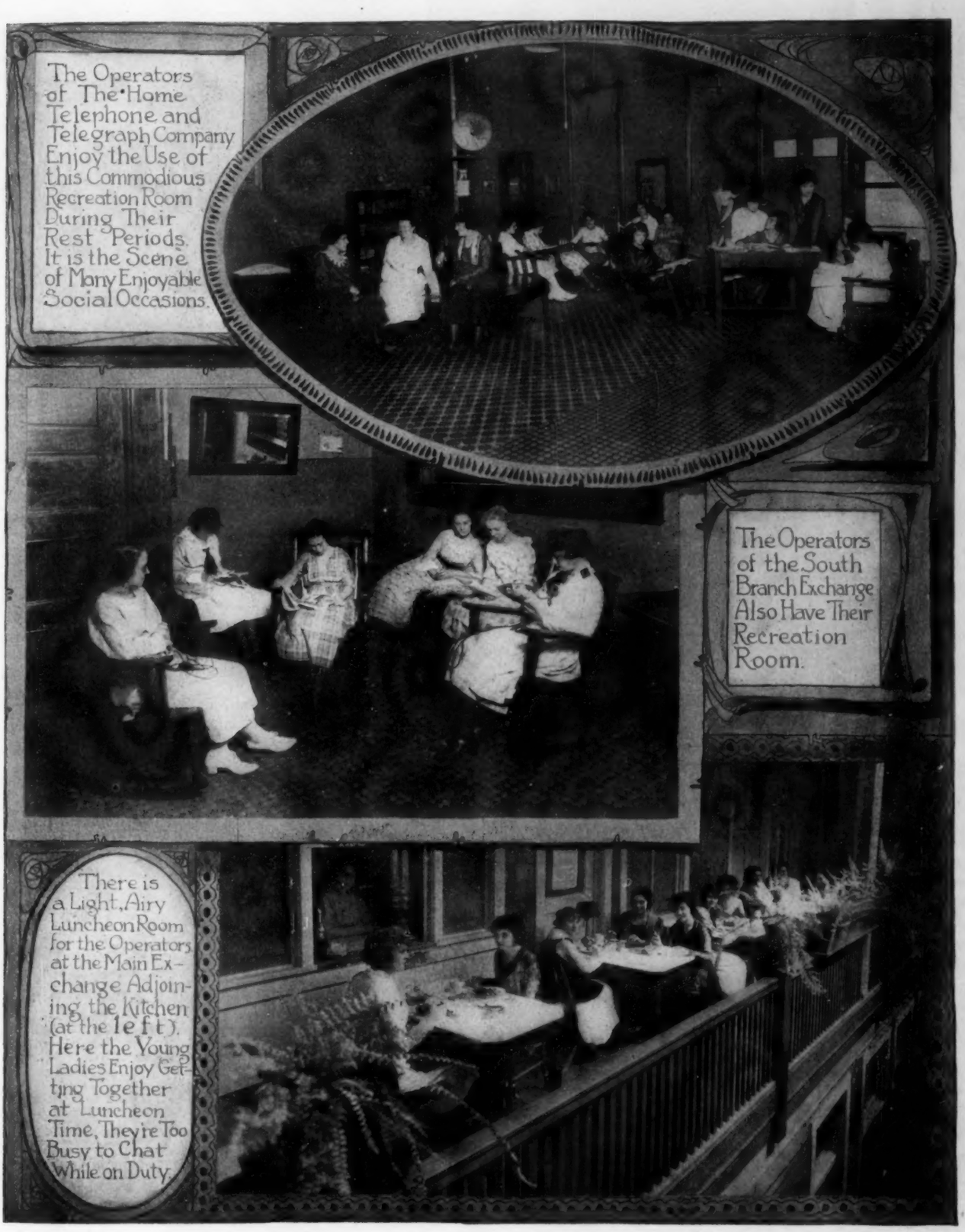
General Manager Frank E. Bohn.

Motor Service and Supply Trucks and Cars of the Home Company, at Fort Wayne; Building Now Being Nearly Doubled in Size.

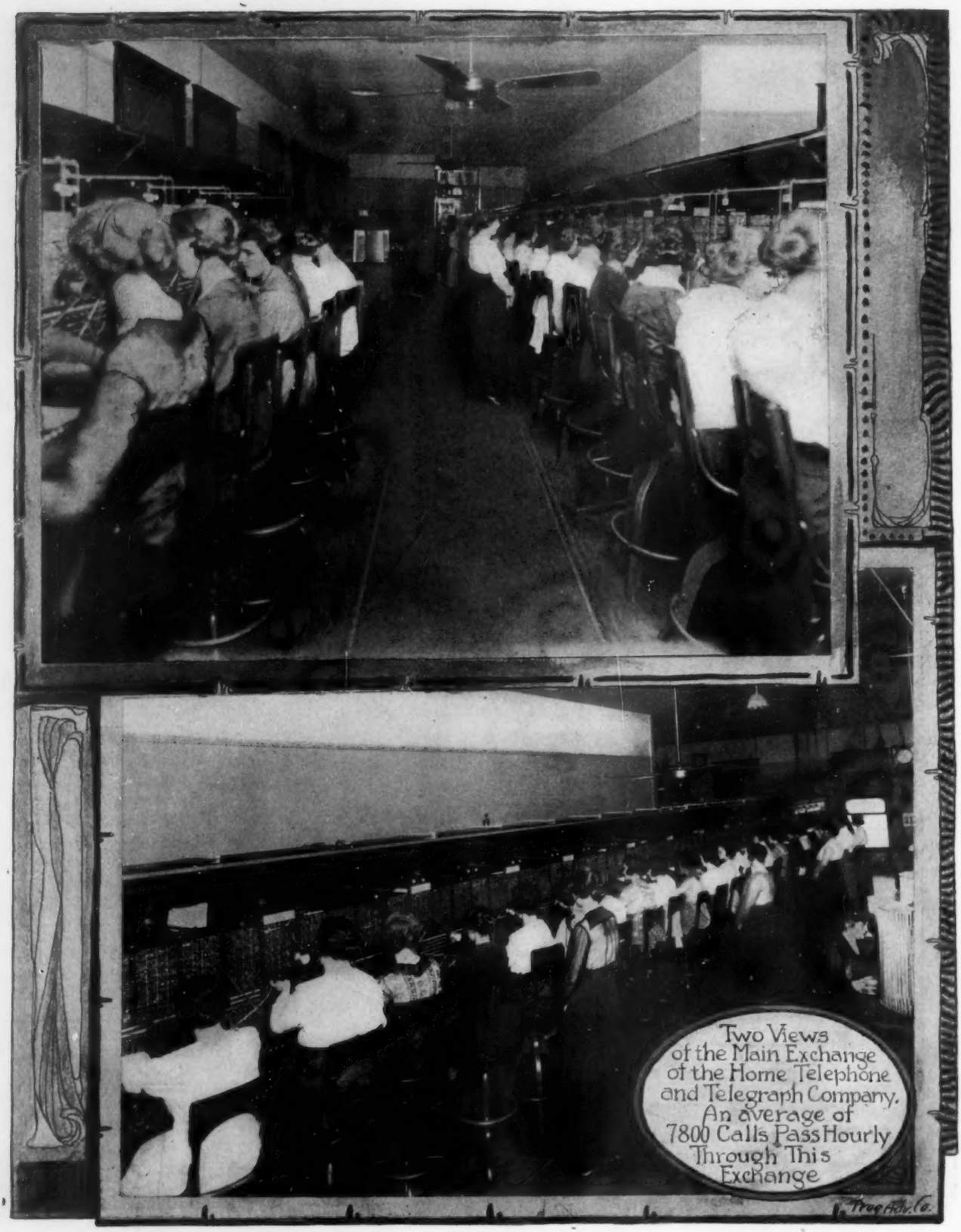
Views in the Operating Rooms of the Home Telephone and Telegraph Company's Exchanges at Fort Wayne, Indiana


A View of the East Side of the Switchboard Room of the South Exchange, on Masterson Avenue
West Side of the Switchboard Room of the South Exchange. Approximately 45% of the Calls Passing through this Exchange are for Main Exchange Numbers
A Busy Scene at the Main Exchange
Group of Operators at Main Exchange, Who Handle Calls From the South Exchange. They are called "B" Operators

Views in the Operating Rooms of the Home Telephone and Telegraph Company's Exchanges at Fort Wayne, Indiana


The Operators of The Home Telephone and Telegraph Company Enjoy the Use of this Commodious Recreation Room During Their Rest Periods. It is the Scene of Many Enjoyable Social Occasions.
The Operators of the South Branch Exchange Also Have Their Recreation Room.
There is a Light, Airy Luncheon Room for the Operators at the Main Exchange Adjoining the Kitchen (at the left). Here the Young Ladies Enjoy Getting Together at Luncheon Time, They're Too Busy to Chat While on Duty.

Views in the Operating Rooms of the Home Telephone and Telegraph Company's Exchanges at Fort Wayne, Indiana



Views in the Operating Rooms of the Home Telephone and Telegraph Company's Exchanges at Fort Wayne, Indiana

A Group of Long-Distance Operators at the Main Office.
Each of the Operators Has a Locker for Her Apparel and Other Property.
One of the Modern Features of the Equipment of The Home Telephone Co. is the School where all Student Operators are Given Thorough Training Before They Are Entrusted with Service at the Switchboard.
For the Convenience of all of its Young Women Employes, the Company Provides this Kitchen Equipment Adjoining the Rest Room and the Luncheon Room at the Main Office.

Automatic Toll Switching

Abstracted from a Paper Read Before the American Institute of Electrical Engineers

By ARTHUR B. SMITH

TOLL service between line and subscriber may be handled in any one of a number of ways. The methods described here are considered the best, as the result of much experience. Person to person calls alone are considered.

The recording toll clerk receives calls from the subscriber over trunks which come from selector banks and terminate on desks. The tickets are made out and passed to the toll line operator in the usual way.

The toll line board is provided with trunks which pass to toll selectors. Over these trunks the toll operator dials the full directory number by using a calling device which is keyed into the circuit. The selectors lead to toll connectors, the latter located in the hundred-line boards, adjacent to the local connectors.

These toll connectors may be used for local service as well. If all the local connectors are busy, the local traffic will take one or more of the toll connectors. In this case the connector acts like a local connector, having the same current supply relays and condensers. When seized by a toll selector, the local apparatus in the toll connector is cut out, leaving a clear circuit from the last selector through the connector to the calling line. The last selector supplies current through a repeating coil.

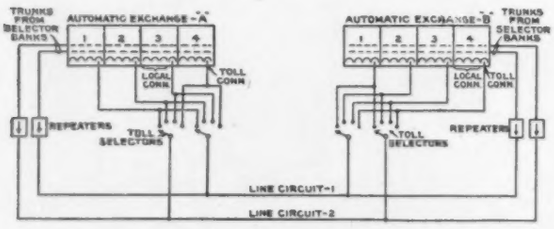


Fig. 1—Automatic Exchanges Connected by Free Automatic Trunks

The ringing is intermittent, but must be started by the toll operator. When the subscriber answers, the ringing stops automatically. If the subscriber hangs up his receiver, the usual supervision is given, and the toll operator may start the ringing again, if desired.

Intermittent ringing is used for toll calls because it has been found to be the more effective than manual ringing. Where local ringing is periodic and toll calls are rung by hand, much delay results. The subscriber is inclined to think that the manual ring is merely some local call which is very shortly released. Consequently he pays no attention to it. But the periodic signal gets his attention and greatly shortens the time of response to toll as well as to local calls.

The toll connector tests the called line as does any connector. If the line is busy, it sends a busy tone to the operator and also extinguishes the supervisory lamp at the toll board. When the line becomes free, the connector seizes the called line, stops the busy tone, and lights the supervisory lamp at the toll board. When the toll operator sees that the line is free, she starts the ringing by pulling a key.

The release of a toll-to-local connection is controlled by the toll operator. Merely pulling the plug out of the trunk jack causes the switches to be restored to normal.

TOLL SWITCHING BETWEEN EXCHANGES

It is desired to consider under this heading the general considerations involved and to give some concrete illustrations of how exchanges are linked together.

General Considerations: The linkage of exchanges of any kind into a network requires, beside the toll lines, adequate means for switching these links to each other and to the lines of the subscribers who are to talk to each other. In arranging this switching, thought must be given to the cost of effecting such connections and the effect of the means on the volume of traffic handled.

The usual manner of handling such calls is to have one or two operators in the originating exchange to connect the originating telephone and the toll line together, another operator at each switching office for toll lines, and one or two operators at the called exchange to connect the toll line to the called telephone. If each exchange has several offices and private branch exchanges, still more operators may be required.

It has been found that the manual switching of toll lines, among themselves and to the subscriber lines, entails considerable loss of time.

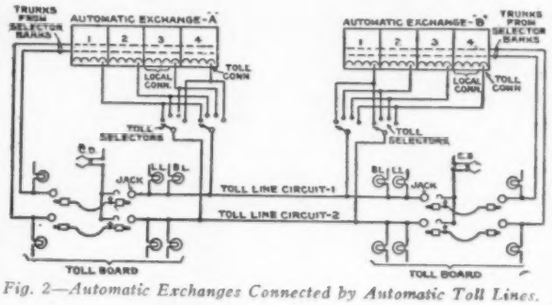


Fig. 2—Automatic Exchanges Connected by Automatic Toll Lines.

This is chiefly due to the time required to gain the attention of operators who have other lines to serve beside the one in question. It lengthens the time required to set up a connection, it interferes with supervision, and delays the release of the circuits after both subscribers have hung up their receivers. This is so great a drag on the service that it has led to the establishment of many direct toll lines between important points, so as to do away with intermediate switching. This lowers the time efficiency of the long direct line, because it cannot be used for any intermediate traffic.

For at least twelve years toll lines have been switched by automatic means and experimenters have been at work producing apparatus which is adapted to this service. The first discovery made was that automatic switching increased the capacity of the toll line at least 50 to 100 per cent. This remarkable increase is due to the speed of connection, the accuracy and promptness of supervision and the quick clearing of the line after both subscribers have hung up their receivers.

No matter how the switches are controlled, the line must permit manual operation at any time, must operate automatically in both directions if both ends are at automatic exchanges, when seized must give posi-

tive indication to all stations concerned and must give supervision of both originating and called subscriber to the one operator who controls the connection.

Uniform operation is highly desirable. This point has received attention in developing automatic switching over toll lines. It is so arranged that if the operator plugs in to the jack of an automatic toll line and rings, the call will go through manually as formerly. But if, after plugging into the jack, the operator throws the calling device key, she can put the call through automatically. After dialing the number, the operator rings with the regular ringing key. This operation holds, no matter whether she is switching toll lines only, or if she automatically completes the connection to the called subscriber.

A few illustrations will show how automatic switching is applied to va-

Fig. 3—Automatic Toll Switching Office.

rious toll traffic services. In order to avoid confusion, the examples will be very simple.

Consider the case of two adjacent exchanges which have free service from one to the other, Fig. 1. Let each exchange be represented by 400-line boards, having selectors and local connectors.

The lines (1 and 2) which carry the inter-exchange traffic are equipped at each end with a selector and are, in addition, multipled to the banks of local selectors. A repeater is inserted between the selector banks and the lines for the purpose of holding the local switches from releasing, feeding common battery for talking, etc.

nected by Free Automatic Trunks.

The banks of the toll selectors are run to the jacks of toll connectors, one in each 100-line board. These toll connectors have their banks multipled to the banks of the local connectors, so that all subscriber lines can be reached.

When a subscriber in exchange A desires to call one in B, he dials a figure which causes his first selector to seize one of the lines, making it busy on the banks of all other first selectors in both exchanges A and B. He then dials the directory number of the desired telephone, which first operated the toll selector at B and then the toll connector in the 100-line board chosen.

If pay service is the rule, the lines can be arranged so that the toll operator at the originating exchange can complete the connection without the aid of the toll operator at the distant exchange, Fig. 2. The toll lines will terminate at each end in toll selectors and jacks and lamps on the toll board. The trunks from local selector banks will also run to the toll board.

When a subscriber in B desires to call one in A, he dials a single figure number which causes his first selector to take an idle trunk to the toll board. The toll operator answers the call in the usual way. She has a calling device which may be associated with any pair of cords. When she plugs into the jack of the toll line, she makes it busy at both ends, showing the busy lamp at exchange A, so that the toll operator there will not try to use the line. The operator at B then dials the call through to the subscriber in A.

The operator at B controls the connection, giving it the usual supervision. When the subscribers are through, she pulls out the switchboard plug, which causes all switches to release.

The identity of the originating station may be verified by having the subscriber hang up his receiver. When the line connection is ready, the operator calls the originating subscriber automatically and permits conversation.

The apparatus is arranged so that the toll lines can be operated manually without change. If the operator after plugging into the toll line jack rings in the ordinary way, she will cause the customary lamp or drop to be displayed at the other toll board.

If between two such exchanges there is a toll central office, the lines can be interconnected by automatic switches with great saving in time. Consider, Fig. 3, four toll lines meeting at a toll office, which is manually and automatically operated. The former may be necessary for handling traffic to and from local subscribers.

Each toll line will terminate in three places, the toll board multiple, the automatic switch bank multiple and the jack of the automatic switch belonging to that line.

If a distant exchange seizes a toll line, it is automatically made busy on the banks of the toll selectors and also lights the busy lamps belonging to it on the toll board. The distant exchange then dials the number of the toll line desired. When that line is seized, it is made busy on selector banks and toll board (as was the originating line).

If the incoming call is for a subscriber in the exchange attached to the toll office, two ways are open for handling it. The distant exchange may ring on the toll line, cause the line signal to show on the toll board at the toll office and use the operator there to complete the connection manually or automatically. The second way is to run trunks from the banks of the toll selectors to the automatic switches of the local exchange and to permit the distant toll operator to dial through to the subscriber and supervise the call.

The application of automatic switching to toll lines in a small net work will illustrate some of the possibilities. For the sake of simplicity, each exchange is limited to 1,000 lines.

Let us consider five automatic exchanges, Fig. 4. Four of them, A, B, C and D, are located at the corners of an approximate square. Exchange M is near the center of the quadrilateral. Assume further that free service is given between all adjacent exchanges, but that a charge is made for traffic between opposite corners (A and D, B and C). The exchanges are numbered from 1 to 5 as indicated.

The exchanges are connected by lines. To keep the illustration simple, assume that there is only one line between adjacent exchanges, eight lines in all. Any link can easily be increased by adding lines and switches without changing the principles described.

Each exchange has two kinds of first selectors, local and incoming. The local first selectors (illustrated by only one, L) handle all the traffic originated by subscribers in that exchange. One bank level carries the traffic into the local switches to local subscribers. Since this is a small system, to keep the numbering uniform, each exchange has a different local level. In A it is the first level, in B it is the second level, etc. The other

levels lead to adjacent exchanges, each according to the number of the exchange. From the second level, a trunk goes through a repeater (R) to the line leading to B, where it terminates on an incoming selector (I-A from A, I-D from D, etc.).

From the third level a trunk goes through a repeater (R) to the line leading to C, where it terminates in an incoming selector (I-A from A, I-M from M, etc.).

The repeater inserted in the outgoing trunk holds the local switches in the originating exchanges.

The incoming selectors (I-A, I-B, etc.) have the right level multipled to the banks of the local selectors (L), so that they have access through the local switches to the local subscribers.

These free lines are in reality two-way trunks. Each end of a line is attached to an incoming selector for incoming traffic and is multipled to the banks of all the local selectors (L) for outgoing traffic.

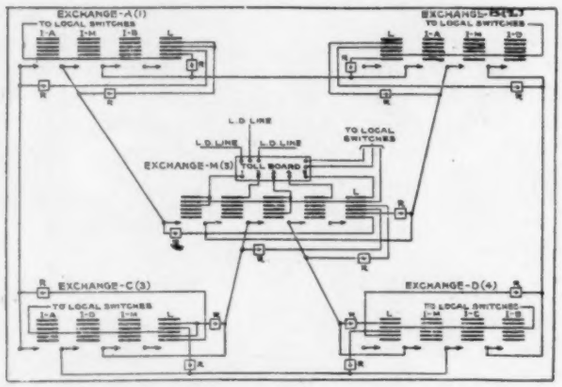


Fig. 4—Typical Network of Small Automatic Exchanges.

Suppose that a subscriber in exchange A calls a subscriber in exchange C, whose local number is 3225. The subscriber in A will first dial the figure "3" which causes his first selector (L) to lift its wipers to the third level and seize the line to C, making it busy at both ends so that no one else can intrude. Then he dials the figure "3" of the local number, which causes the wipers of the incoming selector (I-A) to rise to the third level and to seize an idle trunk to second selectors. The remaining three digits choose the hundreds, tens and units and complete the call.

To handle pay traffic between A and D and between B and C, as well as between the network and the long distance lines to other parts of the country, a toll board is installed at M. All incoming selectors in M have the fifth level multipled into the banks of the local selectors (L) because all the other exchanges are to call M free of charge. But the tenth or "O" level is run separately to the toll board. Any call for long distance by a "C" subscriber will go directly to the toll board, because the directory lists the long distance operator so as to secure that result. "Long Distance" may be listed as "50" or as "00", because the banks of the local selectors (L) at each exchange can be multipled that way.

Trunks from incoming selectors at M and the toll board are kept separate, so that the toll operator knows the origin of each call which comes to her.

If a subscriber at A desires to call some one at D, he is instructed by the directory to call "50" which leads his call to the toll board. The operator makes the charges and completes the call. The operator has lines leading into the local switches through which any exchange is available. If desired, special toll selectors may be set aside for her use. If the identity of the calling station is in question, the operator directs the originating subscriber to hang up. Then she calls the number which he gave, this establishes identity.

If the subscriber at A tries to avoid payment by calling through B or C, he will fail. The incoming selector (I-A) at both these places does not have any connection on its bank for the D exchange. It is impossible to get out of that place. If he tries to dial from A through M, to D, he will run against the same difficulty.

It is possible to multiple the banks of local selectors so that if a subscriber tries to evade payment, his call will be diverted to the toll board. This is done by connecting the level which will be called to the level carrying the trunk to (see exchange C).

Suppose that a subscriber in D has business with a subscriber in B, whom he calls frequently free of charge by dialing "22" plus the rest of the number. If that D subscriber moves to C and attempts to call "22" as before, he will find himself answered by the toll operator at M, who will make the charge and complete the call. Level "2" of local selectors in C is multipled to level "5" and the trunk to M. The incoming selector (I-C) in M has its second level multipled to the tenth and thus to the toll board.

LONG DISTANCE TOLL LINES

It seems to the writer that there is no insurmountable obstacle to prevent the extension of the automatic switching of toll lines to include long distance lines of any length. The only limit is that of desirability. Any distance over which telegraph can be worked can be covered by automatic dialing on toll lines. The problem is more difficult than straight telegraphy, for the transmission of the voice must be safeguarded. But as the advantages become more generally known, automatic switching will be extended as far as there is any advantage to be gained. The farther two points are apart, the more line there is involved in each conversation and the greater the need of economizing time.

THE COMPREHENSIVE SYSTEM

The automatic switching of telephone lines of all kinds is available for building up a comprehensive telephone system of large usefulness. It serves equally well the farmer, the small town dweller and the citizen of the metropolis, and links them all together. Everywhere that telephone lines are to be joined and disconnected, and where human intelligence is not absolutely indispensible, the automatic switch materially increases the efficiency. Every year people are revising their views on what constitutes a real need for human intelligence, and this revision is not confined to any one industry.

Gradually the use of automatic switching is extending its usefulness and raising the effectiveness and the efficiency of the whole comprehensive system.

Home Wireless Telephone Outfit

A company is offering for sale in Great Britain a "home wireless telephone" apparatus contained in a box light enough to be carried by a leather handle. It is claimed the outfit is capable of receiving messages from all the principal wireless stations in Europe. It needs only to be placed on a table and the sounding telephones connected and it is ready for use. No external "aerial" is required. It costs $150.00.

Public Utility Commission News

Reports Concerning the Activities of State Authorities in the Telephone Field

Arkansas

THE Arkansas Telephone Company at St. Francis, Greenway and Piggott was refused permission by the Arkansas Corporation Commission to put into effect its proposed new schedule of rates, but under the order is permitted to increase the rates over what they formerly were.

The present rates at St. Francis are $1 a month for residence, business and and rural phones; at Greenway, business, $2.50 a month, residence, $1.50 a month and rural party lines $1.25. The rates at Piggott are the same as at Greenway. The telephone company proposed to increase the rates in all three exchanges as follows: Business, $3; residence, $2, and rural party lines $1.75.

Under the order the telephone company is permitted to file a schedule of rates as follows, effective March 1:

St. Francis—Business telephones, $2 per month; resident (city), $1.50; rural party line, $1.50; switching (rural), 50 cents; all extensions, $1; desk sets, 25 cents.

Greenway — Business telephones, $2.50 per month; residence (city), $1.50; rural party line, $1.50; all extensions, $1; desk sets, 25 cents.

Piggott—Business telephones, $2.75; residence telephones (city), $1.75; rural party line, $1.50; switching (rural), 50 cents; all extensions, $1; desk sets, 25 cents.

Charges for special service to apply at all exchanges as follows:

Inside moves, $3; outside moves, $3.50; installation of phone, $3.50; change in name, $1.50.

The Arkansas Corporation Commission has issued an order directing the Rice Belt Telephone and Telegraph Company to install an additional board at its Dewitt exchange, to employ an additional operator during business hours, to construct an additional toll line between its Dewitt and Stuttgart exchanges, and to repair and rebuild where necessary its distribution system in the city of DeWitt.

The complaint was filed against the company November 4 by J. M. Brice on behalf of the town of DeWitt, charging exorbitant rates and poor service. An important phase of the order which has a general application to the state at large is set out in the following paragraph from the report of Commissioner T. E. Wood, in which the other commissioners concur:

"With reference to that portion of the complaint in which a statement is made that the Rice Belt Telephone and Telegraph Company is operating an exchange without a franchise from said town in violation of an ordinance, it is the opinion of the commission that this complaint is lodged in the wrong tribunal. The commission is not a court and has not the power to either require specific performance of contract or penalize for failure to comply with ordinances or statutes. Under the act creating the commission a utility is not required to secure a franchise from a city to do business but merely has to show to the commission that it has the consent of the proper local authorities. Upon such a showing the commission will issue an indeterminate permit."

Illinois

The public utilities commission gives the Vermilion County Telephone Company permission to advance its rates, some of them fifty per cent, on condition that it give the public better service. The commission says, in part:

"This commission has often expressed the opinion and reiterates it now, that utilities corporations which enjoy a monopoly in any line of business in a given field should be held to a strict requirement as to the furnishing of adequate service to those who require it and are willing to pay for it. This company has not fulfilled its obligation in this regard, and the commission is impressed with the fact that rates sought might not be unreasonable if the proper class of service be furnished to patrons, and this commission can not and will not permit the rates sought to be made effective until the petitioner has in a full measure discharged its obligations relative to furnish really adequate service."

The company is permitted to increase rates from March 1 to July 1, at which time the old rates must be restored if the service has not then been extended so as to give adequate service within its territory. It will be required to provide service within thirty days to all who have applied and have been waiting for service, and must make monthly reports to the commission on the extensions.

The new rates authorized are as follows:

Danville Exchange.

Individual business, $42, instead of $54, asked.
Two party business, $36.
Four party business, same as now.
Multi party rural business, $24.
Business extension, $12.
Individual residence, $24.
Two party residence, $21.

Westville Exchange.

Individual business, $33.
Two party business, $27.
Business extension, $12.
Multi party rural business, $24.
Individual residence, $21.
Two party residence, $18.
Residence extension, $6.
Residence, rural multi party, $18.

Georgetown Exchange.

Individual business, $27.
Two party business, $24.
Business extension, $12.
Multi party rural business, $24.
Individual residence, $21.
Two party residence, $18.
Residence extension, $6.
Multi party rural residence, $18.

Oakwood, Ridgefarm, Fithian, Indianola and Fairmont exchanges will take the rates given for the Georgetown exchange, except that two party residence phones will be $15 instead of $18. The Catlin exchange takes the same rates as Oakwood, Ridgefarm, Fithian, Indianola and Fairmont, except that individual business phones are $24.

The final summing up of the investigator for the Public Utilities Commission in the Murphysboro Telephone Company's application for an increase of rates, made at the conclusion of a 20-page report, is as follows:

"In general, taking the exchange system of the Murphysboro Telephone Company as a whole, the outside system seems to be poorly engineered and constructed, and not properly maintained. With the exception of West Frankfort the lines are not built according to any set plan, but seem built along the line of the least resistance. More attention should be given to the

switchboard in clearing the minor cases, such as cord trouble and drop and visual signal sticking. The trunk lines between the different exchanges are overloaded, and it is almost impossible to get any kind of county service. These same trunks are used as toll trunks, and on account of very overloaded conditions the local service is very slow.

"Directories are not used as often as prescribed by the Public Utilities Commission of Illinois. On that account the subscribers often call by name and when a new operator is at the board very slow service is to be expected. The Murphysboro, Willisville, Campbell Hill, Ava directory was issued in January, 1919. Carbondale, December, 1918; Herrin, Carterville and Johnston City, June, 1919; West Frankfort and Benton, September, 1919; Anna and Cobden, November, 1918. If the directories are not issued more often than in the past the subscribers get in the habit of calling by name and once they get in this habit it is hard to teach them to call by number."

Rates for service from the Southwestern Bell Telephone Company in Belleville went up when an order permitting the increases was received from the State Public Utilities Commission. The new rates specified are effective March 1.

The new schedule of annual rates for Belleville follows:

Classification	Present Rates	New Rates
Business, individual line	$42	$48
Business, two-party line	33	39
Extension telephones	12	12
Rural telephones	30	30
Service stations	6	12
Residence, individual line	27*	27
Residence, two-party line	24*	24
Residence, four-party line	18*	18
Extension telephones	6	6
Rural telephones	24	24
Service stations	6	6

*Discount of 50 cents per month for prompt payment on three classes of residence service.

Similar rate increases were ordered for East St. Louis under the same decision. The individual business line in that city now costs $54 and the individual residence line $33.

In its petition the company contended the old rates were inadequate and did not produce sufficient revenue to meet all expenses and provide an adequate depreciation reserve.

Detailed statements of revenues, expenses and income for the Belleville exchange were introduced in the evidence; according to a copy of the order received by City Attorney Louis J. Grossmann. The principal points in these statements were:

1. That the total investment in the Belleville exchange is $414,530. On a basis of reproduction cost new and of $357,262 on a reproduction cost new less depreciation basis.

2. That the proposed rates in Belleville would yield a net income for depreciation and return of 3.19 per cent and would show a loss of 2.40 per cent, after making allowance for the depreciation, on a reproduction cost new basis; would yield a net income of 3.70 per cent for depreciation and return and would show a loss of 2.78 per cent after deducting depreciation on a reproduction cost new less depreciation basis.

3. That the income statement for Belleville for the year ending June 30, 1919, shows a net income for depreciation and return of $2,028.08. After deducting the depreciations for the same period this statement shows a deficit of $21,136.13.

4. That additional annual revenue rates is estimated at $11,184. Therefore, even under the proposed rates, after deducting depreciation, there is still a deficit of $9,952.13.

The decision states the commission finds:

1. That the annual revenue resulting from the increased rates in Belleville will amount to $11,184.

2. That increased operating expenses due to increased wages of employes for the Belleville exchange has amounted to approximately $10,142.

3. That after deducting the increase in wages from the additional revenue from the proposed rates for the Belleville exchange there is left only $1,042 of the increased revenue.

Protests against the granting of an increase in the telephone toll charge between Marseilles and Ottawa influenced the Illinois public utilities commission to reopen the case.

The commission recently gave the Marseilles Telephone Company the authority to charge 10 cents for calls between Marseilles and Ottawa, instead of 5 cents, as in the past. The present rate for calls from Ottawa to Marseilles is 5 cents.

The Chicago Telephone Company has asked the Illinois public utilities commission for permission to increase its guaranteed revenue on party lines from 5 to 8 cents a day. Seventy-three per cent of the subscribers use their telephones on an average of 8 cents' worth, but increased guarantee from the other 17 per cent would increase the annual revenue of the company nearly $1,000,000.

Lincoln Phone Rate Case is Continued

The proposed increase in the Lincoln Telephone Company's rates was suspended by the Illinois public utilities commission at Springfield, until July 9. Rates of the Elkhart and New Holland exchanges also are affected by the application.

The Minonk (Independent) Telephone Company has been granted permission by the Illinois public utilities commission to increase its rates. The rates are: Individual residence, $21 per year; two-party line residence, $18 per year, and rural stations $21 per year.

The Illinois public utilities commission suspended until August 28 the proposed increased telephone rates of the Illinois Northern Telephone Company in Mendota, Leland, Sheridan and Earlville.

Toll rates of the Chicago Telephone Company between Elgin and the Plato Center exchange were reduced from 10 to 5 cents in an order issued by the Illinois public utilities commission.

This places the Elgin-Plato Center rate on the same basis as the Elgin-Dundee rate, 5 cents for each message.

Telephone rates of the Central Union Telephone Company in Alton, Wood River and Collinsville were fixed by the state public utilities commission as follows:

Individual business line, $42; two-party business, $30; joint user individual line, $12; extension business telephone, $12; business rural line, $27; individual line residence, $27; two-party residence, $21; four-party residence, $15; residence extension, $6; rural residence, $21.

The order provides further for a rebate to the customers if further investigation of the commission proves the rates to be excessive.

Indiana

Two telephone problems that have been the subject of much controversy for more than a year were disposed of by orders of the Public Service Commission.

One of the orders approved and continued in effect in Indiana the long distance telephone tolls, rules and

charges established during the period of Federal wire control.

The other order establishes a schedule of installation and moving charges, which must be adopted by all companies having annual gross revenue of $10,000 or more. The establishment of the moving and installation charges by smaller companies was made optional on their part.

While the general scheme of long distance tolls was approved, the commission decided that all overtime calls shall be computed on the basis of "station to station" rates, even if the call is placed as a "person to person" call or in any other class of call demanding a higher initial fee than the station to station rate.

The commission directed the various telephone utilities in the state to take immediate steps to secure uniformity in the interpretation and application of the schedule of toll rates and charges, and also directed the companies to take steps by means of publicity and personal communications to inform patrons of the rates, so that they can take advantage of the lower rates if they so desire. The companies were urged also to consider the establishment of special reduced toll rates for Sunday service in order to make fuller use of the toll facilities which would be otherwise idle.

Two reductions in the schedule of moving and installation charges were ordered by the commission. Under the schedule of charges established by the Federal government a charge of $1.50 was provided for establishing telephone service where the instruments are already in place in the subscriber's premises and no change is made in the type of instrument. This charge was reduced to 50 cents. At present a charge of $1.50 is made for a change in name. This charge also was reduced to 50 cents.

The other charges which all companies having more than $10,000 annual gross revenue will be compelled to charge are the same as those now in effect. They are telephone connection charges, $3.50; moving telephone set from one location to another on the same premises, $3; for change in type of telephone set, $3.

Telephone companies earning annual gross revenues of less than $10,000 are authorized to establish the following schedules, subject to their own option: Telephone connection charges, $2; establishment of service where instrument is already on premises and no change in type or location is asked, 50 cents; for moving telephone set from one location to another, $2; for change in type of telephone set, $2; for change of name where service is already established, $1.50.

Moving and installation charges were first established in Indiana by an order of the postmaster general, August 28, 1918, and were approved by the state commission on October 25, 1918. On March 3, 1919, the commission issued an order declaring the charges illegal under the Public Service Commission law. In subsequent litigation the matter of the charges as well as the long distance tolls, which were fought in the courts by the Indiana commission, was carried to the United States Supreme Court. The Supreme Court held that the postmaster general acted within his authority. With the return of the wires on July 1, 1919, provision was made that all rates and charges established by the Federal department should continue in effect until December 1, 1919, unless changed sooner by the state regulatory bodies.

The Indiana commission early in the fall of 1919 began to conduct local hearings on the rates established in each exchange in the state and also on the long distance and moving and installation charges. As it was impossible to issue orders by December 1, the commission continued in effect all of the rates and charges established by the Federal government until orders could be issued.

On September 12, 1919, Commissioner Paul P. Haynes presided at a general hearing on the advisability of continuing the installation and moving charges. Prior to that time about 100 telephone companies applied for authority to continue these charges. It was represented at the hearing that an expense was incurred by the frequent changes in telephone service and that by the application of a schedule of charges revenue would be provided which would in many cases offset the necessity for petitioning for increased exchange rates.

As a result of the conference a committee was appointed to consider the matter and report to the commission. H. O. Garman, chief engineer for the commission, represented the commission; Robert E. Tracy represented the Indiana Municipal League and A. L. Stadermann represented the companies. The committee in its report favored the charges adopted by the commission with the exception that the committee believed that the charge of $1.50 for establishing service where the instrument was already located on the premises was just and also approved the $1.50 charge for a change of name where service is established.

In the long distance toll order the commission emphasizes the necessity of acquainting the public with the complex long distance rate system. Touching on this feature of the new rates the order says:

"It was disclosed at the hearing that the public was not fully informed as to the present schedule of toll rates and regulations. Such schedule of toll rates and regulations is far more complex than those heretofore in force, and has not been fully explained for the benefit of telephone patrons generally.

"For example, it developed that the public generally is not fully informed that reduced rates obtain for 'station to station' messages between the hours of 8:30 p. m. and 4:30 a. m., and that 'station to station' messages can be sent between the hours of 8:30 p. m. and 12 midnight for approximately 50 per cent less than the regular day rates and between the hours of 12 midnight and 4:30 a. m. for approximately 75 per cent less than the established day rates. This feature should be made clear to the patrons of all telephone companies in the state."

That portion of the order which limits overtime charges to the "station to station" rate, which is about 20 per cent lower than the "person to person" rate, says:

"Overtime should be computed on the basis of the initial 'station to station' rate. The commission believes that it is improper and inequitable to base rates for overtime on the higher initial rates for 'person to person' calls, 'appoinment' calls and messenger calls."

The effect of this portion of the order is that all long distance telephone communication will be done on the "station to station" rate, with the exception of the initial call period, which is from three to five minutes, according to the distance of the call.

The Central Union Telephone Company filed with the Public Service Commission a protest against the order establishing new exchange rates in thirty-five cities and towns. The company asserts that it believes the order "unjust and insufficient" and in abiding by its terms it wishes to reserve the right to "make renewed applications as soon as possible for such adjustment of rates as all of its exchanges as will make it possible to meet the constantly increasing expenses of operation."

The company objects to the valua-

tion found by the commission; to the plan for apportioning toll revenues to the various exchanges; to the reduction of the 4½ per cent payment to the American Telephone and Telegraph Company, and to the new rates, which the company asserts are inadequate. The protest sets out that while the company will abide by the terms of the order it desires "to protest against said orders, respectfully but firmly, as unjust, unfair and insufficient to enable the company to establish and maintain its credit, and to discharge its duties to the public."

The protest attacking the order follows in part:

"1. The tentative valuation of the property of the company, both toll and exchange, is wholly insufficient, does not include all the proper elements of value, and does not represent the fair value thereof.

"2. The apportionment of toll revenues to the various exchanges is unfair, because it is predicated upon a rate of return to the company from the operation of its toll lines provided by the orders which is wholly inadequate, does not permit the charging of a sufficient rate of depreciation, and is based upon an insufficient tentative valuation of the toll property.

"3. The rate and amount of depreciation provided by said orders are insufficient.

"4. The finding of the commission in relation to the payment to the American Telephone and Telegraph Company, under the license contract, is erroneous and contrary to law and to the evidence.

"5. The findings of the commission upon the items 'amortization of landed capital' and 'amortization of intangible capital' are erroneous and are contrary to the law and to the evidence.

"6. The rate of return which the orders are designed to produce is based upon tentative findings of value which are wholly insufficient; is not a reasonable rate, but is wholly inadequate to meet the requirement of the company as appears from the analysis of estimated annual requirements and estimated annual revenues made by the commission and its lnding; is not sufficient to attract capital necessary for additions, extensions, betterments and the relief from traffic congestion which the commission orders and recommends, or for the maintenance of that high standard of service which it is the desire and duty of the company to furnish, as well as the province of the commission to require.

"The rate cases of the Central Union Telephone Company were tried under circumstances which made it difficult for the company to present its evidence in such detail as the importance of the issue deserved, and under conditions, which, no doubt, imposed restrictions against the deliberate and mature consideration by the commission of all the questions involved."

The Home Telephone Company, of Portand, has been authorized by the commission to establish an increased schedule of telephone rates. The new schedule provides for an increase of 50 cents a month for individual business service and 25 cents a month for other classes of service. Churches and lodges are to be given one-half rates and joint users are to be charged $1 a month.

The commission has also authorized the Bruceville Telephone Company, of Bruceville, to increase its rates. The new schedule is: Individual business, $2 a month; individual residence, $1.50; rural residence, $1.50. For individual service, a line charge of 25 cents a month for each fourth of a mile beyond the corporate limits of the town was established.

Action on a petition for increased telephone rates in New Albany was postponed until May 1, 1920, by the commission. The Louisville Home Telephone Company and the Southern Telephone Company of Indiana, both operating exchanges in New Albany, have petitioned for rate increases and the city of New Albany has a petition pending for unification of the two systems. The commission postponed action in order that the companies can work out a plan for consolidation, which the commission has been informed is under way.

The commission continued in effect the rates established by the postmaster general in the Fowler exchange of the Indiana Union Telephone and Telegraph Company. The Flora Telephone Company was authorized to continue the Burleson rates.

The Farmers and Citizens Telephone Company of Frankton was authorized to establish an increased schedule of exchange rates. The new rates are: Business individual, $2.65; two-party business, $2.15; individual residence, $1.65; residence, two-party, $1.40; rural business, $2, and rural residence, $1.50. The Thorntown Telephone Company was authorized to increase rates. The new rates authorized are: Business individual, $2; residence individual, $1.50; line charges of 25 cents for each quarter mile beyond corporate limits for individual service; party business, $1.50; party residence (town), $1.40, and party residence, rural $1.50.

An order was issued by the commission granting the Indiana Telephone and Telegraph Company rate increases in Dana and Hillsdale, but compelling a rate reduction in Clinton. The company sought increases in all three cities.

The Dana and Hillsdale rates now are $3 a month for a single line business telephone and $2 a month for a single line residence telephone. Rates of the Monticello Telephone Company were ordered increased to $3.25 for single line business telephones and $2.25 to $2 for single line residence telephones.

Patrons of the Seymour Mutual Telephone Company have renewed their request that the company make a refund in rates as ordered by the Indiana Public Service Commission effective December 1. On July 1 the company placed into effect a schedule of rates under the authority of the Burleson order and the Indiana commission in fixing local telephone rates held the company had no authority for its action and ordered it to refund the difference in rates up to the time the commission's order became effective. The company immediately returned to subscribers the difference between the so-called Burleson rates and the commission's schedule, but the utility body said this did not comply with the order. The commission has informed local subscribers that it will insist upon compliance with its order, but the company contends that a rehearing ought to be granted first.

The Public Service Commission authorized the Central Union Company to sell and the Indiana Bell Telephone Company to buy all of the property of the Central Union in Indiana, except certain property at Terre Haute.

For the physical property and the franchises of the Central Union the Indiana Bell Company is to pay $17,450,700, plus the cost of net additions to the property since October 31, 1919, and subject to the lien on the property of $549,300 of bonds. For the accounts and bills receivable, the Indiana Bell Company is to pay the book value, as of the date of the transfer of the property, and the accounts and bills are to be guaranteed by the Central Union. For the property of the

Indianapolis Telephone Company, if and when acquired by the Central Union, the Indiana Bell Company is to pay $1,250,000, plus the cost of additions made to the property by the Central Union, and to assume $3,000,000 of the notes of the Central Union.

The commission further authorized the Indiana Bell Company to issue and sell at not less than par $9,000,000 in common stock and $11,000,000 of three-year notes, the proceeds to be used in buying the property of the Central Union and for working capital.

The American Telephone and Telegraph Company was authorized to acquire and hold all or any part of the capital stock or notes of the Indiana Bell Telephone Company, authorized by the commission.

The Public Service Commission has authorized an increase in the exchange rates of the Citizens Telephone Company, of Clay county, for Brazil, Clay City and Center Point.

The rates established at Brazil are: Single line business, $4; single line residence, $2.25; rural business, $2.50 and rural residence, $1.75. At Clay City and Center Point they are: Single line business, $3; single line residence, $2; rural business, $2.25, and residence, rural, $1.65.

The New Home Telephone Company was authorized to increase rates at Bloomfield. The new rates are: Single line business, $3; two-party business, $2.50; single line residence, $2; two-party residence, $1.50; rural residence, $1.65, and rural business, $2.25. The Burleson rates were ordered continued at Linton and Jasonville.

Increases in rates were authorized by the commission for the Monticello Telephone Company. The new rates are: Single line business, $3 net, plus a line charge of 25 cents for each quarter mile beyond the corporate limits; single line residence, $2 net, plus the same line charge; party line, rural business, $2 net, and party line, rural, residence, $1.75.

At Burnettsville the new rate is: Single line business, $2.50 net, plus a line charge for each one-quarter mile beyond a one-half mile exchange radius; single line residence, $1.50 net plus the line charge and party line, rural residence, $1.75 net. At Idaville the rate established is single line business, $2.50 net, plus the line charge; single line residence, $1.50 net, plus the line charge and party line, rural residence, $1.75 net.

The Indiana Telephone and Telegraph Company was authorized to increase the rates at Dana and Hillsdale. The new rates are: Single line business, $3 and $2.65, respectively; for single line residence, $2 and $1.65, respectively; rural business, $2.25 and $3, and rural line residence, $1.65 and $1.50. The company was ordered to reduce the rates at Clinton. The new rates are: Single line business, $3; single line residence, $2; rural business, $2.50 and rural residence, $1.75.

The Citizens' Telephone Company, of Kokomo, was ordered to continue in effect the Burleson rates.

The Morgantown Telephone Company, in filing a petition with the commission to establish moving and installation charges, is the first telephone utility having gross revenue of less than $10,000 to seek authorization of these charges. In a recent order moving and installation charges were made compulsory on the part of companies having gross income of more than $10,000, but was made optional with smaller plants.

The Flint-Kyle Telephone Company, operating exchanges at Montgomery and Epsom, is notifying subscribers that hereafter rates will be advanced. The increase comes as a result of a hearing before the Public Service Commission and will be as follows:

Single business line, $2.25; single residence line, $1.75; party line, residence $1.50; party line, rural, $1.50. From this a discount will be given if payments are made before the 15th of the current month.

The prayer of the Flint-Kyle Company for confirmation of the sale of its Odon exchange to the Madison Township Co-operative Telephone Company for $1,500 was granted. This property was appraised by the commission at $1,500.

The Lafayette Telephone Company was denied the right to charge fraternities business rates and to establish temporary short term telephone rates, according to a decision by the Indiana Public Service Commission. The company contended the fraternities used the telephone more than he average business house, and therefore was entitled to the highest rate.

The Public Service Commission has authorized the Darlington Telephone Company to increase rates on single line business telephones to $2 net a month; single line residence to $1.75 net and on single line rural to $2 net a month, plus a line charge of 25 cents a month for each quarter mile beyond the corporation limits. A petition was received from the Centerville Co-operative Telephone Company, of Wayne County, for authority to increase rates on single business lines to $2 net a month; single line residence to $1.50 net and $1.25 net on party lines.

The first attack on the Public Service Commission's order granting increases in telephone rates of the Bell companies in Indiana was made when the city of Muncie filed a petition for rehearing of the case as affecting Muncie.

Grounds set forth in the petition are that the new rates are unjust, unreasonable and discriminatory. The valuation of the company's property in Muncie, on which the new rates were based, is alleged to be too high.

The city also goes into the earnings record of the American Telephone and Telegraph Company, which it holds are too great and should be reduced instead of increased.

A joint petition was filed with the Public Service Commission by the Antwerp (O.) Telephone Company and the Woodburn (Ind.) Home Telephone Company, a newly organized corporation, for the authorization of the sale of the Woodburn exchange of the Antwerp company to the Woodburn company for $13,000. The petition sets out that in January, 1919, in a rate case before the commission, the company's appraisal of the Woodburn plant was given as $22,518, but that the commission allowed a valuation of $18,000. The stockholders have agreed to the $13,000 sale price, the petition says.

The commission authorized the Citizens Telephone Company of Marshall to increase telephone rates to $15 a year for all classes of service.

The commission approved the exchange rates of the Knightstown Telephone Company established last June by the postmaster general. The commission, however, provided that a line charge of 25 cents for each quarter mile beyond the corporate limits be added to the basic town rates for individual business and residence service.

The Mt. Ayr Telephone Company was authorized to increase its exchange rates. The new rates are: Individual business, $1.50 net; individual residence, $1.25 net, plus a line charge of 25 cents for each quarter

mile beyond the corporate limits; two-party business or residence, $1.50 net; party line rural, $1.25 net. The line charge applies only to the individual service.

The Public Service Commission authorized the Veedersburg Telephone Company to issue and sell at par $8,000 worth of stock to reimburse its treasury for additions, betterments and extensions.

The commission also authorized the Home Telephone Company, of Portland, to make an increase in rates. The new rates established by the commission are: Single lines, business, $2.75 net a month; singe lines, residence $1.75 net; two-party, residence, $1.50 net; party line, rural residences, $1.50 net. Bills are payable by the 10th of the month in which service is rendered. New rates for churches and lodges are one-half the rate of business or residence telephones, according to the class of service desired. Joint users, not a subscriber of record, pay $1 a month net.

The Public Service Commission authorized a decrease in rates of the Shawnee Telephone Company. The rates were decreased on single business telephones from $1.60 a month to $1.50 net, on single line residence telephones from $1.50 to $1.35 and on multi-party rural lines from $1.40 to $1.25. On single line business and residence telephones there is a line charge of 25 cents a month for each quarter of a mile beyond the first half mile from the exchange.

The commission announced a change in the order of February 9, as printed, in regard to the charge for change of name where service is established for telephone exchanges of $10,000 gross revenue or less. The order, through typographical error printed this charge as $1.50 and it should be 50 cents.

The Bruceville Telephone Company was authorized to establish an increased schedule of rates. The new net rates are: Individual—Business, $2; residence, $1.50; rural residence, $1.50. Party line—Business, $1.75; residence, $1.25; rural business, $3; rural residence, $1.50. For individual service a line charge of 25 cents for each one-fourth mile beyond the corporate limits is provided.

The Laurel Telephone Company was authorized to establish the following net basis exchange rates: Individual—Business, $1.75; residence, $1.50; party line, business, $1.50, and $1.25 for other classes of service.

Action of the Indiana Public Service Commission in officially recognizing steps for consolidation of the Home and Bell Telephone Companies' lines in New Albany is believed generally to reflect speeding of negotiations for the proposed merger of both companies in Louisville, as well as resulting ultimately in establishment of one telephone service for the three Fall Cities. Jeffersonville now has only the Bell system.

The Indiana Public Service Commission has postponed until May 1 hearings on separate petitions of the Home Telephone Company, of Louisville, and the Southern Telephone Company, operating the New Albany Bell lines, for authority to increase rates in that city, and the petition of Col. Charles L. Jewett, New Albany city attorney, requesting that the two companies be forced to form a physical connection of their lines. This, it is explained, means the possibility of subscribers of one system being able to converse with the subscribers of the other.

In its ruling continuing all three of the petitions, the Public Service Commission states that the commission is advised that negotiations now are in progress for the purpose of bringing about a consolidation and unification of the telephone service in New Albany, but that further time will be required in order to perfect such plans. In view of this situation, it is stated, the commission is of the opinion that the final determination of the cases should be postponed until May 1, and that in the interim steps should be taken to perfect a plan of consolidation and unification of service.

Kentucky

Appointment of a public service commission and the delegating to it of board regularity powers over public utilities, express companies, telephone and telegraph lines, bridges, boats and ferries and common carriers not under the control of the Railroad Commission, are prepared in a bill offered in the Senate by Senator Brig H. Harris, of Ashland.

A commission of three appointed by the Governor and drawing salaries of $5,000 a year each, is provided. The license tax of $60,000 is to be apportioned among the corporations causing control of the commission, to meet its expenses.

Governor Morrow is understood to endorse the bill.

Michigan

Approval of the issuance of $500,000 worth of additional stock by the Union Telephone Company, serving numerous towns around Alma, was granted by the Michigan public utilities commission. The money is to be used in paying off $208,487.39 indebtedness and for extensions, betterments and improvements of plants and facilities in Owosso, Alma, Mt. Pleasant, St. Louis, Corunna, Elsie, Carson City, Breckenridge, St. Johns, Hemlock, Shepherd and toll lines through the company's territory.

In Owosso the company expects to spend $37,500. Of this $30,000 is for enlarging the exchange, installing additional cables and switchboard. A new garage and warehouse is to be erected at a cost of $7,500, on a site for which the company owes $2,500.

Alma is to be the chief beneficiary, the expenditures there totaling, according to testimony before the commission, $95,000. In that city the company plans to install a new switchboard, and to rebuild and extend the present plant, including underground equipment. Manager William J. Melchors testified that Alma is growing rapidly and estimated the census will show that city has a population of 8,000. Mr. Melchors has a most optimistic feeling as to the growth of Alma, he said, privately after the hearing.

Plans call for spending $54,000 in Mt. Pleasant for new switchboard, underground plant and extending the outside plant. To secure additional cable capacity $5,000 is to be spent in St. Louis.

Corunna is to secure $15,500 for reconstruction of the entire outside plant and central office, including additional switchboard facilities.

For Elsie the company has appropriated $5,000 for rebuilding and enlarging the outside plant.

Rebuilding and enlarging the outside plant at a cost of $8,500 is the plan for Carson City.

Breckenridge service is to be improved by installing $1,000 worth of new cable, while at Durand the expenditure for such work is to be $3,000.

At St. Johns, underground and additional cable calls for spending $8,500. Reconstruction and enlargement of the outside plant at Hemlock has caused the company to appropriate $2,000. To better its service at

Shepherd the company will reconstruct the central office and put in new outside cable.

For toll lines the company will spend, through its territory, $55,000. In addition, for miscellaneous growth of subscribers, which is estimated will make it necessary to purchase 500 telephone poles at $20 each, the company plans to spend $10,000. The total amount which the company asked the commission to approve was $511,-987.39.

Included in the company's bills payable is $125,857, due the Michigan State Telephone Company, $18,205.39 owing to the Kellogg Switchboard and Supply Company, and to banks in the territory served, various amounts ranging from $1,725 to $10,000.

Manager Melchors testified as to some of the cities served. St. Louis, he swore is "growing substantially," Shepherd and Breckenridge "a little," Owosso "rapidly."

To illustrate the rapid growth of the company, Mr. Melchors said the company's calling rate had increased, he estimated, 60 per cent per hour per instrument since July and August, when an actual count had been made.

He said it was the intention of the company to offer the stock at not less than par to present stockholders, in proportion to their present holdings, and that if they did not take it all to offer it generally to the public at not less than par. The company's stock has sold, he testified, as high as $11 with a par value of $10. The company has a capital of $1,000,000 and no bonds.

It paid 8 per cent interest until the postmaster general returned the lines. Since then money has been taken from surplus to pay a part of the interest. It was agreed by Mr. Melchors and Chairman Smith that under the order as drafted this money taken from surplus can be repaid from the sale of stock just authorized. The order requires the company to report on June 30, this year, and every three months thereafter the progress of stock sales.

The East Shore Telephone Company, operating in Berrien county, has both won and lost its fight before the Michigan Public Utilities Commission. This company, which is owned by two sisters living in Chicago, has given service which has aroused ire on the part of patrons.

As a result of this feeling, attributed to poor service, the Chickaming Telephone Company sought a certificate of "pubic convenience and necessity" to put in a telephone system paralleling that of the East Shore.

The utilities commission refused the certificate, without which the company cannot legally do business. But in the order the commission declares that if the East Shore company by May 1 does not so rebuild and repair its lines "so as to render reasonably adequate telephone service to its subscribers" present and future, the denial "may be reconsidered" by the commission.

The Michigan State Telephone Company was refused permission to make further temporary increases in rates by the State Public Utilities Commission.

Missouri

Judge J. G. Slate sustained the State Public Service Commission in its action in reducing the charges allowed the Bell Telephone Company some $200,000 a year. The commission forbade the company charging the rate allowed by Postmaster General Burleson while he was in control of the wire companies of $3.50 for installing every telephone and $1 for changing names in the telephone directory. The company filed an appeal to the Supreme Court. Under the order of Judge Slate the company may continue to collect the excess charges, but it must execute a bond for $200,000 to impound the excess until such time as the Supreme Court has disposed of the appeal.

Ohio

The Ohio Public Utilities Commission placed a valuation of $58,650 on the property of the Central Ohio Telephone Company at Centerburg.

The Centerburg-Mt. Vernon Telephone Company has made application to purchase the Centerburg plant.

The plant of the Central Ohio Telephone Company at Sparta, was appraised by the commission at $24,263 upon the request of the Morrow County Telephone Company.

Following the lead of the Central Union Telephone Company in asking for increased rates, the Ohio State Telephone Company has filed new schedules with the commission, proposing to increase rates April 1 in Toledo, Dayton, Youngstown, Alliance, Salem, Lisbon, East Palestine and other smaller towns in the vicinity of Youngstown.

The rates of these companies were only recently increased and the commission allowed the Burleson rates to be continued temporarily.

The schedules propose an increase from $72 to $84 for individual business lines in Toledo and an advance of from $39 to $45 for individual residence lines. In Dayton the increase is from $60 to $66 on individual business lines, and $30 to $33 on individual residence lines. Alliance rates are boosted from $42 to $48 for business telephones, and $24 to $30 for residence telephones. The rate for business lines in Youngstown is proposed to increase from $60 to $72 and and the residence rate from $36 to $42.

City Attorney Henry L. Scarlett, of Columbus, appealed to the Ohio Supreme Court the Citizens' Telephone rate case, in which the city seeks to compel the Ohio State Telephone Company to live up to its franchise granted in 1899, in which the rates were fixed at $42 a year for residence telephones and $72 a year for business teephones.

The suit is brought by Scarlett against the state public utilities commission on appeal from a ruling of the commission, in which it refused to interfere with the increased rates allowed while the telephone companies were under federal control. The commission allowed the increased rates to continue after the federal control ceased as emergency rates. Scarlett insists the company is bound by its contract and cannot legally charge rates in excess of those stipulated in its contract, and that the commission is without jurisdiction.

A similar case from Newark is pending before the court.

An increase in rates has been granted to the Noble County Telephone Company by the state utilities commission to become effective at once. This company operates in practically every part of Noble county. The company has been operating its lines under the old rate for the past 14 years. During the late war the old rates were maintained in the hope that things might later adjust themselves so that there would not have to be an increase in the rates. The company is now forced to increase rates due to the high prices for all material and to the high cost of operating.

Declaring that abnormal expense during the year 1919, due to increased cost of both labor and material has made equitable relief necessary at once in the shape of increased reve-

nues, The Lima Telephone and Telegraph Company has filed a new rate schedule with the Public Utilities Commission at Columbus.

A similar application filed early last spring was rejected by the commission, that body explaining at the time that there were too many Ohio companies seeking to increase rates to grant all, and that as a result none would be granted. Since then, however, rates have been increased in every Ohio city in which the Bell company operates, the telephone company maintains.

The effective date for telephone rate increase in eight principal Ohio cities has been postponed from March 1 to April 1, counsel for the Central Union Company announced at conclusion of a hearing before the state public utilities commission. The cities affected are Columbus, Toledo, Akron, Dayton, Springfield, Youngstown, Sandusky and Zanesville.

Postponement of the rate increase for one month was taken, company counsel said, to give the commission time to examine the records and testimony given at the hearing. E. S. Bloom, Chicago, president of the Central Union Telephone Company, was the principal witness at Wednesday's hearing.

He told of expenditures and revenues in a comparative way, saying the company is worse off than in 1915, by about $580,000, due to the fact that the increase in revenue has not kept pace with the expenditures.

"In the last five years," he testified, "the highest net earning of the company available for interest on investment was 1.3 per cent in 1915. In 1918 there was a deficit of .9 of one per cent and in 1919 the net earnings of the company amounted to .8 of one per cent. The last six months of 1919 showed net earnings of $143,000 in the entire division, due to the fact that labor and other costs constantly increased without corresponding increases in rates for service."

Tennessee

The Alexandria Home Telephone Company must immediately restore its former relations with the Gainsboro Telephone Company in the matter of long distance telephone connections for the subscribers of the Alexandria Company, according to a ruling made by the Tennessee Public Utilities Commission. The new board of officers and directors recently severed relations and the city of Alexandria has been cut off from long distance communication with the outside world.

The subscribers of the company filed a protest with the public utilities commission a short time ago, asking that this service be restored on its former basis.

New York

A report by the public service commission on telephone service, shows, among other things, that there are upward of 46,000 applications for telephones now unfilled in New York City.

In excusing this, as well as other alleged breaches, the telephone company calls attention to the tremendous size of the city and the huge equipment needed for its system of communication. It acknowledges that its present equipment is entirely inadequate to handle New York's 4,150,000 calls a day, but it cannot get any more under present conditions. It admits, also, that it has not sufficient operators, but pleads that it could not foresee such a tremendous increase in business.

The telephone operators are well paid, the company asserts, fifteen dollars a week being a minimum wage, which is paid during a week of schooling, and this is increased to $25.47 a week after six years of service. Recently, it has been paying a five dollar bonus to each employe who succeeds in bringing in a new telephone operator recruit.

The report of the public service commission quotes the same wages, but it says it is to be regretted that the company did not establish this standard sooner. "While a small increase in pay runs into millions," comments the report, "the commission cannot but be impressed with the thought that the company has cherished too dearly its policy of a fixed annual dividend of eight per cent to its stockholders and that under the present exigencies it should, if necessary, be willing temporarily to forego to some extent this establishel return in order to reconstruct its service . . "

One of the interesting features of the situation is the fact that the public service commission making this report is the up-state commission, having a state-wide jurisdiction over telephones although the down-state commission is supposed to look after utility affairs in the city of New York. In other words, the state is leading the fight for the improvement of the city's telephone service, and not the city itself.

Washington

Permission was granted by the public service commission to President W. Neal Winter of the Puget Sound Telephone Company to try out in the next thirty days twenty "telechronometers."

The telechronometer will measure telephone service as other meters measure what they are designed to do. If it proves successful Everett citizens can have a telephone on an eight party line for 50 cents a month, according to the basis of the time distance rates which the company has evolved for use in connection with the system. These rates will be submitted to the subscribers in connection with a petition for adoption by subscribers themselves after trial has been given the telechronometers in twenty places of public nature.

A single party business or residence telephone would cost a minimum of $1.50 a month and as much more as the meter reads, but "the conversation charge is not to exceed 1 cent for each minute of service charged to the originating subscriber only and to commence after the operator answers each call and to cease upon replacement of the receiver," reads the petition of the company to the public service commission. A four party telephone, business or residence, would cost a minimum of 75 cents a month.

In presenting the petition Mr. Winter called the attention of the commission to the fact that "a great economic saving will result through the adoption of the time distance basis brought through elimination of all frivolous and unnecessary use which is now recognized a heavy burden, and a greater equity will result to the individual subscriber through this correct principle of service charge."

Wisconsin

The railroad commission cannot compel the consolidation of telephone exchanges in a municipality, even though such consolidation would result in economy of operation and lower rates for subscribers, according to a decision.

The Ettrick Telephone Company and the Western Wisconsin Telephone Company each operate telephone exchanges in both Ettrick and Galesville. The commission recommended a scheme of consolidation which would eliminate one of the extra exchanges in each village. The Western Wisconsin Company agreed

to this, but the Ettrick company refused.

Ninety per cent of the latter company's subscribers are stockholders, and, at the annual meeting, they voted unanimously to pay higher rates rather than consolidate. The commission has, therefore, authorized an increase in rates from $12 to $15 a year and established a charge of $6 per year for extension telephone.

The railroad commission increased the rates of the Mt. Horeb Telephone Company following its application for an adjustment of the schedule. Under the order magneto one-party service will cost $2.50; for two-party service $1.75. Common-battery one-party business service will cost $2.50 and two-party $2.00.

The residence rates for one-party common-battery service at $1.75 and two-party $1.50. The residence rate for magneto one-party service $1.50 and two-party service $1.75.

The railroad commission authorized the Colfax Telephone company to place in effect the following rates: local business one-party line per month, $2.50 net; two-party, $2.25 net; local residence one-party per month, $1.75 net, two-party $1.50 net, four-party, $1.40 net; rural party line per quarter, $5.25. Bills are to be made out for 25 cents per month in excess of the rates given, the excess to be a discount for prompt payment. The company serves in all 516 subscribers. It owns a half interest in the Elk Mound, the Bloomer, the Prairie Farm and Ridgeland, and the Wheeler telephone companies, with all of which it is connected. The book value of the company's property is $36,000.

Through an order recently issued by the railroad commission the Milton Junction Telephone Company was authorized to put into effect the following rates: local business single party, $2.25 a month, four-party $1.75 a month, extensions 50 percent additional; local residences, single party, $1.75 a month, four-party $1.25, extensions, 50 percent additional; rural $5.25 for three months. The subscribers are to be billed at 35 cents more a month in each case, with a discount allowed for bills paid on time. Application was made by the company for the increase Nov. 11.

The application which was presented to the commission by the company said that very little had been done in the past three or four years by the company. It is further stated by the company that in rebuilding and reconstructing under normal prices the cost to the company would result in the valuation at 33 1-3 per cent higher than is now shown, while to accomplish this under prevailing prices would result in a valuation of at least 75 per cent greater than now carried on the company's books.

The Chippewa County Telephone Company, which operates exchanges at Eau Claire, Chippewa Falls, Eagle Point, Jim Falls, Cornell and Holcombe applied to the railroad commission September 27 for authority to increase its rates. The commission has authorized the company to put into effect the following schedules:

At the Chippewa Falls and Eau Claire exchanges: single party business, per month, $3.00 net, party line business, $2.50 net; single line residence, $1.75 net, two-party residence, $1.50 net, four-party residence, $1.25 net; rural residence, per quarter, $6.00 net.

At Eagle Point, Jim Falls, Cornell, and Holcombe exchanges: one-party business, per month, $2.25 net, two-party $2.00 net; one-party residence, $2.00 net; two-party, $1.75 net, four-party, $1.50 net; rural residence, per quarter, $6.00 net.

Minnesota

The Edgerton Telephone Company is authorized to place in effect, as of April 1, 1920, the following schedule of rates for local and rural telephone service at Edgerton, Minnesota:

	Per Month
Individual Line Business	$2.50 gross
Individual Line Residence	1.75 gross
Four-party Line Residence	1.25 gross
Rural Multi-party	1.50 gross
Rural Multi-party, business exclusive	2.50 gross
Business Extension	.75 net
Residence	.50 net
Extension Bells	.25 net

All rates to be billed gross except where quoted net. A discount of 25 cents per month to be allowed on all gross rates if bill is paid on or before the last day of the month in which the service is rendered, except the rural multi-party rate, which is payable quarterly in advance, with a discount of 75 cents if paid on or before the last day of the first month of the quarter; 50 cents if paid on or before the last day of the second month of the quarter; and 25 cents if paid on or before the last day of the third month of the quarter in which the service is rendered.

The Hammond Telephone Company is permitted to place in effect, as of April 1, 1920, the following scredule of local telephone rates at Hammond, Minnesota:

	Per Month
Individual Line Business	$2.00 gross
Two-party Line Business	1.75 gross
Individual Line Residence	1.75 gross
Four-party Line Residence	1.50 gross
Rural Multi-party	1.50 gross

All rates payable monthly in advance, with a discount of 25 cents per month if paid during the month in which the service is rendered, except that rural rates are payable quarterly in advance, with a discount of 75 cents if paid during the first month of the quarter; a discount of 50 cents if paid during the second month of the quarter, and a discount of 25 cents if paid during the third month of the quarter in which the service is rendered.

It is further ordered that the records and accounts of the Hammond Telephone Company be kept in accordance with the commission's uniform system of accounts.

The Sherburne County Rural Telephone Company is permitted to place in effect, as of March 1, 1920, the following local and toll rates at its Big Lake, Clear Lake, Becker and Zimmerman exchanges:

	Per Month
Individual Line Business	$2.50 gross
Two-party Line Business	2.25 gross
Extension Telephones	.50 net
Individual Line Residence	1.75 gross
Two-party Line Residence	1.50 gross
Rural Multi-party	1.75 gross
Rural Switching	.35 net
Joint User Service	1.00 net
Extra Listing in Directory	.25 net

A discount of 25 cents per month to be allowed from all gross rates if paid on or before the 15th of the month in which the service is rendered.

Toll rates, Clear Lake to Becker, 10 cents; Clear Lake to Big Lake, 15 cents; Becker to Big Lake, 10 cents.

The Garden Valley Telephone Company is permitted to purchase the telephone properties of the Clearwater Farmers Telephone Company at Plummer and Oklee, Minnesota.

The Howard Lake Telephone Company is permitted to place in effect, as of April 1, 1920, the following schedule of local and rural telephone rates at Howard Lake, Wright County, Minnesota:

	Per Month
Individual Line Business	$2.00
Extension Stations	.50

Individual Line Residence	1.25
Extension Stations Residence	.50
Aural Multi-party	1.50

The application of the Lewiston Telephone Exchange Company to increase its local and rural telephone rates at Lewiston, Minnesota, will be heard at the Village Hall in the village of Lewiston, at 3:00 P. M., on April 1.

The application of the Northwestern Telephone Exchange Company and the Tri-State Telephone and Telegraph Company to fix boundaries and arrange proper directory listings for certain telephone subscribers residing in Prospect Park, Minneapolis, will be held before the commission at its office in the State Capitol, St. Paul, on Monday, April 5, at 10.00 A. M.

The application of the Cannon Valley Telephone Company to increase its local and rural rates at Montgomery, LeSueur Center, Elysian, Waterville and Janesville, Minnesota, will be held in the following order:

Hearing at Montgomery in Village Hall at 10.30 A. M. on April 7.

Hearing at LeSueur Center in Village Hall at 2:30 P. M. on April 7.

Hearing at Waterville in telephone office, at 10:00 A. M. on April 8.

Hearing at Janesville in Commercial Club Rooms at 10:00 A. M. on April 9.

Hearing for Elysian will be held in conjunction with the hearing at Waterville.

The application of the Kerkhoven Telephone Exchange Company to increase its local and rural telephone rates at Kerkhoven, Minnesota, will be heard at the Village hall in the village of Kerkhoven at 1:15 P. M. on April 13.

The application of the Hancock Telephone Exchange Association to increase its local and rural telephone rates at Hancock, Minnesota, will be heard at the Town and Country Club in the village of Hancock, at 9:00 A. M. on April 13.

The application of the Worthington Telephone Exchange to increase its local and rural telephone rates at Worthington, Minnesota, will be heard at the City Fire Hall in Worthington at 9:00 A. M. on April 16.

The application of the Harmony Telephone Exchange Company to increase its local and rural telephone rates at Harmony, Minnesota, will be heard at the Village Hall in Harmany at 9:00 A. M. on April 22.

The application of the Rollingstone Telephone Company to increase its local and rural telephone rates at Rollingstone, Minnesota, will be heard at Schuh's Hall, in Rollingstone, at 9:00 A. M. on April 23.

The application of the Norwood-Young America Telephone Company to increase its local and rural telephone rates at Norwood, Chaska, Carver, Waconia and Cologne, Minnesota, will be heard in the following order:

Hearing at Chaska, in the City Hall, at 10:00 A. M. April 26.

Hearing at Cologne in the City Hall at 3:00 P. M. on April 26.

Hearing at Norwood in the City Hall at 1.00 P. M. on April 27.

Hearing at Waconia in the City Hall at 9:00 A. M. on April 27.

Hearing for Carver will be held in conjunction with the hearing at Chaska.

Telephones Need Help Like Railroads

"In the clamor about the proper legislation for the preservation of the railroads after their return to their owners, it should not be forgotten that all the telephone systems of the country, taken over bodily by the government during the war, were returned back on short notice just a few months ago—and without any remedial legislation. The seriousness of the railroad situation cannot be minimized, but the problems of the telephone companies are in their way just as serious."

Pointing out that "there are in this country, several hundred thousand citizens with their money invested in telephone properties to an aggregate of over two billions of dollars," the Illinois Committee on Public Utility Information declares that there are 300,000 persons employed and that about 60 cents out of every dollar of running the average telephone system goes for wages.

"Those who are engaged in the telephone business are no more immune to the high cost of living than those in other lines of work—and as it has cost them more and more to live, their pay had to go higher and higher. The equipment and material the companies must buy to keep up their plants has increased in cost from 30 to 300 per cent—an average of perhaps 75 to 85 per cent for the things most frequently used. Sundry expenses have all increased too; they average around 60 per cent higher than in 1914.

"It has been practically impossible to keep the services up to pre-war standards in most places. The difficulty of obtaining labor and materials for maintenance work during the war prevented many companies from maintaining their plants to the old standard; every telephone company is going to need considerable money during the next year to put its property back to the old standard of efficiency.

"It will surprise the average citizen to learn that the increases in exchange rates hardly average 20 per cent since 1914. In some cases no increases have been made whatever. As no utility can manufacture even a reasonably satisfactory service when its income is inadequate for the purpose must look at both sides of the question. The telephone company is possessed of no magic power by which it can obtain present-day labor and meet present-day expenses at pre-war prices. It is not a free agent; its income is limited by the rates it is allowed, by regulation of public authority, to charge for its services. When that rate is too low, the service must inevitably fall below the standard of efficiency needed and demanded by the American public.

"Telephone service has become too valuable and too essential in our every day life to allow it to become impaired or less useful when usually so moderate an advance in the cost of the service to each user is all that is necessary to keep the business going and the service satisfactory, even in these days of the high cost of living."

Interstate Commission's November Figures

Telephone companies earned more last November than during the same month a year before, according to figures made public by the Interstate Commerce Commission. Net operating revenue for sixty-four companies in November were $8,950,424, an increase of $939,308 over the net operating revenue in November, 1918.

Gross revenues for November totaled $36,575,181, an increase of $6,821,083 over the preceding November. Operating expenses aggregated $27,625,757, compared with $21,744,782 in November, 1918.

Of Interest to the Trade

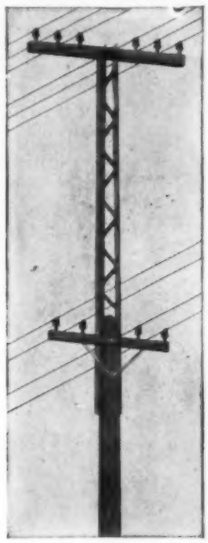
What the Telephone and Accessory Manufacturers are Doing to Advance the Art

Extension for Making Short Poles Long

In these days of advancing cost of labor and materials, the superintendent of line construction will especially welcome apparatus that permits extension of pole heights to accommodate an extra circuit.

The versatility of this apparatus is demonstrated in the fact that it eliminates the necessity of replacing butt-decayed poles. By merely cutting off the old pole at the ground, resetting it and adding a Hull extension frame, the pole is restored to its original height and strength at a real saving of time, labor and material.

S. W. Hull & Company, 3729 Prospect avenue, Cleveland, Ohio, has been marketing a practical extension frame that has met with the approval



The Hull Pole-Extension

of line construction superintendents in all parts of the country.

The principle is simple, yet remarkably efficient and economical. Two main compression members of steel angles, reinforced by steel lace bars, comprise the frame. The frame is fastened to the top of the pole by three through bolts. A special feature is the great number of cross arm heights possible. A cross arm can be bolted at the intersection of every lace bar. The main compression members open and close to fit any size wood pole top.

Report of the Stromberg-Carlson Company

The board of directors of the Stromberg-Carlson Telephone Manufacturing Company have submitted the audited statement of account for the year ending December 31, 1919, consisting of a balance sheet showing the financial position of the company at the close of the year, and the profit and loss and surplus account for the year, certified by Price, Waterhouse & Company.

The further improvement in the company's financial position and earnings, shown by this statement, is very interesting:

Balance Sheet

ASSETS

Fixed Assets:		
Machinery, Factory equipment, Tools, etc. (less Reserves)		$ 269,111.57
Current Assets:		
Raw Materials, Supplies, Work in Process and Finished Product	$878,218.97	
Accounts Receivable (less Reserve)	421,677.35	
Notes Receivable	438,812.85	
United States Liberty Bonds and Canadian Victory Bonds at market	168,780.00	
Cash on hand and in Banks	90,028.83	1,997,518.00
Deferred Charges		11,794.13
		$2,278,423.70

LIABILITIES

Capital Stock:		
Authorized	$1,000,000.00	
Issued	$845,000.00	
Less—Held in Company's Treasury	17,100.00	$ 827,900.00
Current Liabilities.		
Notes given Banks	50,000.00	
Accounts Payable (including Accrued Wages and Taxes)	94,904.31	
Provision for War Excess Profits and Income Taxes	58,000.00	202,904.31
Reserves:		
For Contingencies	$ 50,000.00	
For Market Fluctuations in Inventory Values	200,000.00	250,000.00
Surplus		997,619.39
		$2,278,423.70

Profit and Loss Surplus Account

Surplus at December 31, 1918		$ 687,783.79
Net Income for the year, after deducting expenditures for ordinary repairs and maintenance amounting to $51,684.54	$370,202.65	
Deduct—Charges for depreciation	61,707.35	
	$308,495.30	
Less: Interest on Notes	$2,398.33	
Reduction of Government Bonds to market	6,920.00	9,318.33
Net Profit for year ending December 31, 1919, before providing for War Profits and Income Taxes	$299,176.97	
Deduct—Provision for War Profits and Income Taxes	58,000.00	
	$241,176.97	
Add—Reserves established at organization of Company, not required at December 31, 1919, transferred to surplus	133,895.60	
Sundry Credits applicable to prior years	505.03	375,577.60
		$1,063,361.39
Deduct—Dividends paid		65,742.00
Surplus at December 31, 1919, as per Balance Sheet		$ 997,619.39

Memphis Independent Is Finally Absorbed

The final chapter in the history of the Memphis Telephone Company, the independent company which started business about 17 years ago, has been written. The stockholders' investment was wiped out and the physical property is now owned by the Cumberland Telephone and Telegraph Company.

The deal for the independent company was begun months ago. While it was pending fire destroyed the big switchboards and interior equipment of the company, but the outcome was about the same, as the contract was carried out without much change. The bonds, amounting to $416,000, are indorsed by the Cumberland interests, which assumes their final payment. About $35,000 in cash was paid the stockholders, but that will be absorbed in the expense of closing the contracts including legal fees.

The Cumberland company secured the building on Monroe avenue and two or three small pieces of realty. The most valuable part of the Memphis company's plant was the underground conduit system, built to accommodate more than 5,000 telephone stations, which the Cumberland company is now using. The old wires are being removed and with much of the other old worn-out equipment will be sold for junk.

There were only about 1,000 stations operated by the Memphis company that were not used by persons who also had connection with the Cumberland exchange. Only about half of those subscribers have asked for connection with the Cumberland exchange.

The old Memphis company last year surrendered its franchise to the city and in connection with the deal, the Cumberland company proposed a new schedule of rates, and promised improved service in return. The city administration in office at that time agreed to the proposition, but later, when the Cumberland company applied to the state public utilities commission for permission to make the agreed higher rates permanent, the city withdrew from the contract and rescinded the resolution authorizing those rates.

Since then the new administration has taken no steps to have any change made in the rates, and that question is now awaiting the final report of the Chamber of Commerce special telephone committee. No complaint as to rates probably will be made if the promised improved service is given.

The local officials of the company say that they are making every effort to improve the service and that with an increase in the force of operators and new equipment which will soon be received the public will within the next 30 days find little cause for complaint.

Stromberg-Carlson in New Toronto Location

The Canadian headquarters of the Stromberg-Carlson Telephone Manufacturing Company are now located at 35 McCaul street, Toronto, and shipments of all standard apparatus and construction material are now being made with the same promptness that characterized the service prior to the fire that gutted the warehouse at 10 Front street, East.

N. W. Baldwin, in charge of Canadian sales, reports that although the stocks in the old warehouse were totally destroyed, there was sufficient equipment in storage elsewhere and in transit to enable resumption of shipments to customers five days after the fire.

Telephone men are cordially invited by the company to make themselves at home at the new Stromberg-Carlson offices whenever they have occasion to visit Toronto.

Jacksonville, Florida, Being Merged

According to a statement issued by R. L. Boyd, district manager for the Southern Bell Telephone and Telegraph Company, the two telephone systems in Jacksonville—the Southern Bell and the Home plants—will be consolidated about May 1. That is, the physical connection with the two plants will be completed about that time, and the plants will operate as one big system. The Bell recently took over the Home plant.

Manager Boyd's statement is as follows:

"About May 1 the Riverside exchange of the Home company will be connected with the Bell system and the automatic telephones in the Riverside section will continue in operation.

"Subscribers now connected with the Riverside exchange of the Home company, who subscribe to Bell service, will continue to use their same instruments, but will be able to secure connection with any subscriber in Jacksonville. Gradually all subscribers in the Riverside section will be furnished with automatic telephones and this exchange will be enlarged to take care of all subscribers in that section.

"On or about May 1 the main exchange of the Home company will be closed and the equipment in this office will be transferred as rapidly as possible to the Riverside exchange, so that the cable facilities of the Home company may be utilized to relieve the telephone congestion.

"Owing to the fact that considerable time will be required to rearrange the cables of the Home company and connect them properly with the enlarged system, there will still be some delay in meeting the service demands of new subscribers.

"The main exchange of the Home company will be operated just as present until May 1 at the old rate. On that date Home subscribers who have contracted for Bell service will be connected with the consolidated system and the Bell rate will be applicable.

"When the Riverside exchange is connected with the Bell system a new directory will be published and it will be important for telephone users to consult the new book before making a call, because many telephone numbers will of necessity be changed.

"The reason the automatic equipment is to be confined to the Riverside section, is that there is not sufficient automatic equipment to handle any other section of the city on an automatic basis and that it could not be secured within a reasonable time. It was found, however, that by transferring the equipment from the main office of the Home company to the Riverside exchange there would be enough equipment to ultimately handle the entire Riverside section with automatic telephones.

"All the subscribers in Riverside will not be furnished with automatic telephones at once. It will be necessary to install considerable mechanical equipment in the Bell main exchange in order to operate it in connection with the automatic exchange and this will require considerable work. As rapidly, however, as the work is completed additional subscribers in Riverside will be connected with the automatic office.

"The introduction of the automatic exchange in connection with the main office will not reduce the number of operators and other employes required in Jacksonville. In fact, more employes will be needed, owing to the growth of the system and the increasing volume of work involved."

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

Personal Notes

B. E. Sunny has announced the appointment of John Lawrence Spellman as publicity manager of the Chicago Telephone Company, succeeding Clifford Arrick, who resigned to accept the vice-presidency of the National City Bank of Chicago. Mr. Spellman was born in Chicago thirty-five years ago and was educated in the Chicago public schools. For fifteen years he has been employed by Chicago morning newspapers, most of the time in "covering" the City Hall and writing principally on gas, telephone, traction and electric-light matters, in their relations with the City Council and the State Public Utilities Commission. Mr. Spellman has been employed at various times by the City

Press Association, the Chicago *Tribune*, the Chicago *Record-Herald* and the Chicago *Herald and Examiner*. He was day editor of the old *Record-Herald*, and retires as automobile editor of the *Tribune* to join the telephone organization.

ALABAMA

Verdict for the defendant was returned by the jury in Judge Richard V. Evans' division of the circuit court at Birmingham, Ala., which has been hearing the damage suit filed by Louis B. Holmes as administrator of the estate of Edna Holmes, deceased, against the Southern Bell Telephone & Telegraph Company and others for the death of his 18-month-old daughter. According to the allegations of the complaint, an automobile in which the Holmes family was riding on the Mount Pinson road last August was caused to turn over by being caught in a dangling wire alleged to be owned by the defendant telephone company, R. S. Munger, B. M. Allen and Geo. W. Bains. Edna Holmes was caught beneath the auto and received injuries from which she died. Evidence for the defendant tended to show that the overturning of the auto was due to the efforts of Holmes to turn the automobile in the road, and the jury took this view of the case.

E. H. Hix, for the past four years district manager of the Cumberland Telegraph and Telephone Company at Birmingham, has resigned to accept the district managership of the Mutual Benefit Life Insurance Co. His resignation became effective February 15 and he was succeeded by W. A. Deale, who has been manager of the Cumberland office at Columbus for the last five years.

ARKANSAS

A. C. Merritt, who has been manager of the Pine Valley exchange of the Southwestern Bell Telephone Co., has resigned to accept a position with the Rice Bell Telephone Company of Stuttgart as manager of the local exchange at DeWitt.

E. N. McCall, who was transferred to Ft. Smith to temporarily fill the place vacated by C. A. Vedder, who a few months ago was transferred to Little Rock, has been appointed district manager of the Southwestern Bell Telephone Company, with headquarters in Fort Smith.

E. E. Clements, electrician, formerly employed at Pine Bluff by the Southwestern Bell Telephone Co., was electrocuted at Kaufman, Tex., according to information received by his sister, Mrs. A. F. Herrington. No details of the accident were given except the statement that he was killed while handling wires. He was employed by the Texas Light and Power Co. of Kaufman. The deceased is survived by his wife and one daughter, and four brothers, D. R. Clements, of Pine Bluff; Z. M. Clements, of Texarkana; Fred Clements, of Hope, and Connie Clements, of Chillicothe, Tex.

The Southwestern Bell Telephone Co. wants to put its telephone wires at Arkadelphia, Ark., underground at the time the streets in Improvement District No. 1 are paved, according to a statement made by a member of the street committee at a recent meeting of the City Council. The matter was referred to the ordinance committee, to be taken up with the manager of the telephone company. The only hitch in the discussion seemed to be that an ordinance ordering the telephone company to remove its poles from the city streets would necessarily include the city water and light plant's electric wires and the telegraph company's. The willingness of these corporations to comply with such an ordinance was not stated.

Mrs. Lucie Creesinger, state chairman of the Arkansas branch of the Association of Bell Telephone Operators, holds the long-time record as an employe of the Little Rock Bell Telephone Company. She has been in service 14 years. During that time she has filled every position on the exchange from "hello girl" at the board to supervisor and chief operator. Her present position is that of evening chief operator. The Association of Bell Telephone Operators has branches in all states. It is made up of the personnel of the exchanges. No employe holding a position higher than that of chief operator is eligible. The organization in Arkansas has 12 chapters and a membership of several hundred. Little Rock has 275 operators. The object of the organization is to care for the interests of the employes. It will co-operate through a committee with the officers and directors of the Southwestern Bell Telephone Company. Other officers include Miss Mamie Hogan, Fort Smith, vice state chairman; Mrs. Mildred Finley, Hot Springs, state secretary.

CALIFORNIA

The electrical workers employed by the Pacific Telephone and Telegraph Co. in Nevada, California, Oregon, Washington and Idaho recently went on strike to enforce demands of an increase of $1 a day in wages.

COLORADO

Word has just been received of the death of Edward Bell Field, vice-president and treasurer of the Mountain

States Telephone and Telegraph Co. at Hot Springs, Ark., on February 7.

GEORGIA

The Southern Bell Telephone Company has secured a 20-year lease from J. W. Callahan on his two-story building on the corner of Broad and Troupe streets, in Bainbridge, effective June 1. The company will spend a large sum in improving the property and equipping the plant with the latest improved facilities. J. W. Feagin is the local manager.

ILLINOIS

Presentation of evidence in the case of the Central Union Telephone Co., which is petitioning for maintenance of present rates in Peoria, was completed in the hearing before the state public utilities commission in Chicago. When the decision of the commission will be made is not known, according to Corporation Counsel R. H. Radley, who has led the fight against the rates increase.

The ten cent charge made by certain hotels in Chicago for telephone calls where the call issues from the room of a guest is illegal, according to an opinion furnished by Corporation Counsel James A. Ettelson. The five cent charge is all that legally can be charged, according to the opinion.

State investigators for appraisement, now "counting the poles and wires and tacks" of the Murphysboro Telephone Co.'s system throughout many counties in Southern Illinois, declare the work will cost the state fully $50,000. The property investigation is being made at the instance of the objections of thousands of subscribers in the downstate to the company's application for increased telephone and toll rates.

The Strasburg Mutual Telephone Co., Windsor, Ill., has purchased the Ebtmeire property. The small building occupied as central office, now located on leased ground, belonging to T. A. Weber, will be moved across the alley east to the company's new possession.

At a meeting of the stockholders of the Montgomery County Mutual Telephone Co., held recently at Hillsboro, Ill., the following new directors were elected: W. E. Morain of Irving; D. S. Grisham of Waggoner, and W. B. Wright, of Nokomis.

The Sullivan Home Telephone Co. has put into effect a small increase in the monthly rate for telephone service. Business telephones will be $2.85 per month, residence telephones $2, and where on party lines $1.75. From these rates there will be the regular monthly discount of 25 cents if paid by the 15th of each month.

A check for $410,915.48 has been turned over to the city comptroller of Chicago by the Chicago Telephone Co., representing three per cent of their gross receipts for the six months ending December 31, 1919. This is said to be the largest payment the telephone company has made the city under the franchise agreement by which the company must reimburse the city for the use of public streets and alleys.

The Zeigler Booster Club is taking steps toward the installation of a 125-line telephone system. A committee consisting of George P. Baggot, A. Vaughn, John Thelgutt and Dr. I. A. Foster was appointed to investigate thoroughly the various methods and report at the next meeting.

Examiner Hugh Dillon of the state utilities commission heard evidence recently on the application of the Chesterfield Telephone Company for the right to eliminate free service through its exchanges. Evidence was also heard on the petition of the same company to increase the rates of Medora.

On February 1 the Auburn Telephone Co. discontinued the practice of reversing the charges on toll messages originating in Auburn and vicinity. The reason for this action is that the Bell Telephone Co., which owns the long-distance lines, would allow the Auburn company no revenue for handling this business.

The directors of the Hindsboro Mutual Telephone Co. have elected officers as follows. President, Bert Creviston; Secretary, C. E. Helm; Treasurer, Bert Orr.

The annual election of the Lincoln Telephone Company resulted in the election of five directors, as follows: William M. Young, Will C. Bates, Wilbur J. Gullett, C. E. Gullett and F. W. Longan. The only change was the election of W. C. Bates to succeed E. C. Lutz, former member of the board, and secretary of the company. Officers of the company will be chosen by the new board of directors at a meeting in the near future.

Operators of the People's Telephone Co. recently went on strike following the refusal of their requests for an increase in salary of $6 per month. Officers of the institution refuse to make any statement.

Miss Ida Mae Stebbins, 47, chief operator for the Vermilion County Telephone Co., Danville, for nine and a half years, and an employe of the company for nineteen years, died Feb. 8 at the family residence, 22 South Alexander street, of pneumonia, following influenza.

The Murphysboro Telephone Co. has been ordered to report to the State Public Utilities Commission at Springfield the progress it has made toward rehabilitation. The company has been granted a temporary increase in rates. Among the cities served are Murphysboro, Duquoin, West Frankfort, Carbondale, Campbell Hill, Ava, Marion, Herrin, Carterville, Cambria, Springs, Johnston City, Pittsburgh, Willisville, Benton, Thompsonville, Christopher, Royalton, Ewing, Sesser, McCleansboro, Anna, Cobden and Jonesboro.

The Bureau County Board of Supervisors by formal action took sides with the 6,000 telephone users in Bureau County who are fighting the attempt of the Bureau County Independent Telephone Company to abolish the county right and raise the telephone rates. The board by unanimous vote authorized the chairman to appoint a committee to represent the county at the hearing before the Public Utilities Commission and instructed the state's attorney to assist in the legal phases of the contest. The board will be represented at the hearing by State's Attorney Josef T. Skinner and by the chairman, E. F. Norton and Supervisors Claude Brown of Princeton, and F. C. Jacoby, of Arlington.

The El Paso Telephone Company is preparing to rebuild the lines in El Paso this summer and plans are practically completed. Much of the new work will be in putting cables underground. When the work is finished El Paso will have one of the most complete and efficient systems in the state.

The Mt. Vernon and Liberty Telephone Co. is making repairs on its line, commencing at a point on the road at or near the L. & N. railroad right of way, and extending from thence east to the east boundary of the road.

A. B. Hoff has become sole owner of the two telephone systems at Yates City, known as the Ideal and Farmers systems. Mr. Hoff will unite the two systems and will move to Yates City to assume control and operation of the property.

The Newton Telephone Company has been declared insolvent and through its trustee, E. W. Hersh of that city, has filed a petition in the federal court at East St. Louis to foreclose the $50,000 trust deed held

against the company. Ed Nigh was named receiver with bond of $20,000.

The Mississippi Valley Telephone Company has filed a petition with the public utilities commission asking for authority to discontinue its free exchange service between Carthage and Bentley and Denver and to charge a toll.

The other day a Waukegan repairman went to a home to test out a telephone. In the hall he was met by a masked Negro who demanded the nature of his business. The repairman informed the erstwhile master of the house what he had come for, and went over to the instrument and took the receiver off the hook to call the wire chief. Feeling the business end of a .38 at his back, he replaced the receiver and headed a short procession to a bedroom where he was detained for further orders. When the marauder had finished his job, he transferred his prisoner from bedroom to a closet in another part of the house where he again locked him up. Some few minutes later the repairman broke his way out, tested the phone, gave the place a hurried "O. O." and returned to the office.

INDIANA

The Mutual Telephone Company of Leesburg has sold its lines in Leesburg and vicinity to the Public Service Telephone Company. Leesburg equipment of the Mutual company will be moved to Atwood.

Stockholders of the Eaton Telephone Company elected Homan Roye a member of the board of directors to succeed the late Charles F. Brooke, president of the company. The directors have organized for the year by electing Charles B. Cokefair president; Elam Fisher vice president and treasurer, and L. D. Lesh, secretary.

Corwin Telephone Manufacturing Company, Lafayette, filed final certificate of dissolution.

The city of Muncie on March 10 filed a petition with the Public Service Commission for a rehearing of the Central Union Telephone Company rate case as it applies to Muncie. The petition sets out that the rates at Muncie were increased over the Burleson rates, while the rates at Anderson were decreased. Because of poor service the city avers that the Muncie rates should not have been increased over the Federal rates. The city takes the position that in view of the large amount of dividends paid by the American Telephone and Telegraph Company, of which the Central Union is a subsidiary, the Muncie rates should be decreased rather than increased.

Definite announcement that The Seymour Mutual Telephone Company will ask the Indiana public service commission to review its rates in Seymour with the view of securing permission to make higher charges for service has been made by the company. The notice came at the same time that a statement was issued that the company is sending rebate checks to subscribers in compliance with the commission's order of December 1, 1919. At the time the commission instructed the company to rebate to subscribers the difference between the so-called Burleson rates placed into effect July 1 and the former rates for the period they were charged.

Edward Vinton Haines, forty years old, formerly general auditor of the Indianapolis Telephone Co. and subsidiary companies for twelve years, died suddenly March 2 at Toledo, O., of cerebral hemorrhage. Mr. Haines went to Toledo the first of the year to become field sales manager of the Woolson Spice Company, of that city. He visited with friends in this city two weeks ago, and at that time seemed to be in perfect health. He is survived by the widow and one child and by his mother.

Extensive enlargements of Evansville's telephone system will be made this year, according to an announcement of G. G. Hall, general manager of the Southern Telephone Co. of Indiana. About $70,000 will be spent in improvements.

The city of Muncie has filed a petition with the public service commission for a rehearing of the petition of the Central Union Telephone Co. at Muncie, to which the commission recently granted an increase in rates. The city of Muncie as respondent in the petition of the telephone company alleges that the fact that the rates for the Anderson exchange were decreased, while those for Muncie were increased is discriminatory. The former Burleson rates, the petition says, were too high, but the city would not have complained had they been continued but the increase granted, the city alleges, is unfair in view of the poor service. The petition sets out that the net earnings of the American Telephone and Telegraph Company for 1919 were $60,000,000 and the dividends $35,000,000, and the Indiana Bell Telephone Company paid $39,000,000 in dividends. The petitioner says in view of the unprecedented and enormous profits derived by these parent organizations from the operation of telephone properties, including the Muncie exchange, all rates and charges should have been reduced by the commission instead of increased.

R. R. Burrin, who has been manager of the Parke County Telephone Co. for several months, has tendered his resignation to take effect April 15. Mr. Burrin will then move to Cleveland, O., where he has secured a position with the Harley-Davidson Motorcycle Co.

The Antwerp Telephone Co. has sold the Woodburn telephone lines and exchange to Woodburn citizens. The Woodburn cities have formed a company to be known as the Woodburn Telephone Co.

A petition has been filed with the Indiana public service commission asking for approval of the purchase of the Home Mutual Telephone exchange at Leesburg by the Public Service Telephone Co., of Leesburg. The two exchanges will be consolidated.

The Ripley Farmers' Co-operative Telephone Co. has petitioned the public service commission for increased rates.

Petitions addressed to the manager of the local Central Union Telephone exchange, are being circulated and largely signed by the rural subscribers, stating that if the recent raise of rental rates of 25 cents per month allowed by the public service commission is put into effect, the signers will have their telephones removed.

Hearings in the case of the LaPorte Telephone Co. before the public service commission was commenced March 4 with Judge Edwards, of Indianapolis, and N. E. Rowley representing the corporation in their petition for an increase of rates. Attorneys Conboy and Wolfe appeared for the city. It was pointed out by the attorneys for the LaPorte Telephone Co., that an increase was warranted if the company is to make desired improvements and render the service demanded by the public. Figures were submitted to show that in the past twenty years of operation the company has never asked for an increase, but at one time voluntarily cut the rate on the telephones of the city. According to the figures submitted by the appraisers of the property it would cost the LaPorte Telephone Co. $505,110 to replace its present lines and unless the increase is granted the stockholders of the company will not realize interest on their investment.

Condemning the proposed increase in rates for the Home Telephone Co.,

Louisville Post, Travelers' Protective Association, at a recent meeting adopted resolutions urging the city council to vote against the telephone ordinance now before it. Action on the ordinance was deferred by the council at its last meeting after an extended hearing, in which representatives of many civic bodies spoke in opposition to the measure.

The Southern Indiana Telephone Co. will put in a new cable from the Lawrenceburg exchange to Newton to supply that part of the city.

Permission to submit further evidence in support of its plea for increased rates was asked of the Indiana public service commission by the Home Telephone and Telegraph Co., of Ft. Wayne. Hearing in the case was held by the commission at Ft. Wayne, September 25, 1919. Since that time, the petitioner asserts, conditions have arisen that will increase the operating costs of the company considerably.

A petition has been filed with the public service commission by the Shawnee Telephone Co., of Stone Bluff, Fountain county, for permission to reduce telephone rates 15 cents a month from the present net rates except for extensions. The net rates are, for single line business, $1.65; for single line residence, $1.50, and for two-party rural, $1.40. A line charge for single line residence and business telephones of 25 cents a quarter mile beyond the first half-mile is made. The petition also asks that the toll rates between Stone Bluff and Attica and Stone Bluff and Hillsboro be increased from 5 cents for three minutes or any fraction thereof to 10 cents for the first five minutes and 5 cents for the next three minutes or any fraction thereof.

Twelve operators employed in the telephone exchange at Cambridge City recently went on strike following a refusal of the company to increase their wages from 25 cents to 30 cents an hour.

The city of Muncie in its answer to the petition of the Central Union Telephone Co. to sell and convey its property to the Indiana Bell Telephone Co. will show that the city has a valid claim against the Central Union Telephone Co. for 2 per cent of the gross receipts of the company for the last eight years, as set out in the franchise under which the company operates in the city of Muncie.

A joint petition of the Mutual Telephone Co., of Stony Point, and the Public Service Telephone Co., of Leesburg, has been filed with the commission, asking approval of the sale of the Leesburg exchange of the Mutual company to the Public Service Co.

The United Telephone Co., organized about 1893, with Al Oppenheim, Hugh Dougherty and W. H. Ernst as the prime movers, has gone out of business, and the Bell has finally absorbed it.

The stockholders of the Hope Independent Telephone Co. at the annual meeting elected the following officers: President and manager, George W. Dorrell; secretary, Scott W. Dorrell, and treasurer, Harris Dorrell. Scott W. and Harris Dorrell are sons of George W. Dorrell, and at the meeting the three bought up all of the outstanding stock of the company except $4,000 preferred owned by O. W. Bowman, of Rising Sun.

The White Star Telephone Co., of Westfield, has filed a petition with the public service commission asking for a business telephone rate of $1.50 a month and a residence rate of $1.25, with a deduction of 25 cents a month if bills are paid a year in advance.

The Hoosier Telephone Co. has been sold to L. C. Griffitts and J. H. Andrews, of Seymour, Ind. It is reported that Mrs. Leander Davis, Mrs. Mary J. Bowman and William Markland, who controlled a majority of the stock, sold their interests to the above named gentlemen for about $19,000. Mr. Griffitts is an experienced telephone man, and is reported to be a representative of the Southern Indiana Telephone and Telegraph Co., which, in all probability will absorb the Hoosier in the near future. He states a toll line from Brownstown to Salem will be constructed at once, connecting the Jackson, Jennings and Scott county systems with the Washington and Orange county systems.

Officers of the Commercial Telephone Co. have been elected as follows: President, Simon Strauss; vice-president, John D. Widaman; secretary, Joseph S. Baker; treasurer, A. O. Catlin; manager, J. W. Scott. Directors: Odell Oldfather and Allen Widaman.

Unification of all the Bell telephone systems in Indiana into one company, which will be purely a local corporation, is provided for in articles of incorporation filed with the secretary of state by the "Indiana Bell Telephone Co." The new company is incorporated for $15,000,000, and intends "to operate telephone lines and exchanges within and throughout all of the counties, towns and cities of the state." There will be 86 exchanges in the new company. The system will represent a valuation of between $20,000,000 and $30,000,000.

The Farmers' Mutual Telephone Co., Bear Branch, filed preliminary certificate of dissolution.

War-time telephone rates are to be continued in Jeffersonville as the result of a ruling announced yesterday by the public service commission of Indiana on a request made by the Southern Telephone Co. of Indiana. The telephone company asked that war-time rates be permitted to continue in twenty-three other towns of southern Indiana. The ruling included these in the order. An increase of 25 cents on residence and four-party lines was refused by the commission. Reductions in charge for removals and for changes in names were ordered.

KENTUCKY

The board of directors of the Fulton Rural Telephone Co. met at the Farmers Bank recently and were in session several hours. T. E. Brady presided and all members of the board were present. The question of incorporating the company was considered. All the stockholders in Fulton, without exception, favor the proposition. The board decided to take no definite action till the meeting to be held the fourth Saturday in March.

At the regular meeting of the board of trustees of London, March 5, an ordinance introduced by the Tri-State Telephone Co. for the sale of a telephone franchise for the town of London, was passed by the four members present, Mr. J. M. Young, chairman, being absent. Upon his return to the city, Mr. Young refused to sign the ordinance, claiming that the rights of the town and its citizens were not protected by the proposed franchise, which he says is a one-sided contract.

Advances going into effect April 1, are being made in the rates of the Cumberland Telephone Co. to its subscribers in suburban and rural Jefferson county. It is said that these advances are being made to conform with the Cumberland company's rates in Louisville for corresponding service. Those who are being served under contract for local exchange service only will not be affected in the raise. Jeffersontown patrons of the company, who have been paying $3 per month for local and Louisville service, will, according to the new rate, be required to pay $3.50 for the same service. For business telephones, including Louisville service, patrons will pay a rate of $7 per month, instead of $6, according to the new adjustment.

For Louisville service, including local, residence party line subscribers will be required to pay only $2.50, if within a radius of one mile of Jeffersontown.

J. W. Obannon, of Carrollton, is the newly appointed manager for the local telephone exchange and took charge March 1, succeeding Mr. Chambers, who recently resigned.

The Jefferson county March grand jury took up the investigation of the alleged means and methods used and reasons behind an effort of the Louisville Home Telephone Co. to secure the passage of an ordinance granting higher rates. Two representatives of the Allied Public Service League, which asked the probe were summoned as witnesses. Subpoenas were also issued for politicians, officeholders, legislators, stock brokers and officials of the telephone company, including A. T. Hart, Judge John M. Lassing of Newport; Senators C. M. Harriss and Hiram Brock; Speaker Joe Bosworth, Prosecuting Attorney Robert H. Lucas, of Louisville, and Mayor Smith.

The Murray Telephone Co. has raised the rates of some of its patrons 50 per cent.

The stockholders of the Maryville Telephone Exchange at their annual meeting elected W. L. Webster chair, man, Joe McNutt treasurer, and B. L. Glascock secretary of the committee of control for the coming year. W. J. Huffstetler, who has served acceptably as manager for several years was re-elected.

A. W. Davis, owner and manager of the Home telephone system at Hickman, which was completely destroyed by ice in January, has taken down all the wires and telephone poles of that concern in the city. The country telephones, wires and telephone poles will be sold to farmers, who will get connection with the Cumberland company, thus doing away altogether with the Home company, which has been in operation for the past eleven years.

Damage done to telephone lines at Maysville during recent sleet and snowstorm was greater than at first reported. Wires have been replaced in most every damaged quarter, and the total cost of repair work alone has exceeded $12,000.

The capital stock of the Grayson County Telephone Co., Leitchfield, has been increased from $5,000 to $15,000.

The sale of the Bowling Green Home Telephone Co., under order of the U. S. District Court, which was to have been held on March 10, 1920, has been postponed on account of the dangerous condition of Mr. S. M. Heller, special master. Mr. Heller was operated upon about ten days ago, and his condition is such as to prevent him attending the sale.

There will be no raise in telephone rates in Madison county above the regular contract rates which were in effect for several years before wartime rates were temporarily put on. The Madison County Fiscal Court has denied the increase which is sought by the Cumberland Telephone and Telegraph Co.

Work of reconstructing the Nicholas Home Telephone lines after the sleet storm in the county will entail an expenditure of about $15,000.

LOUISIANA

The Cumberland Telephone and Telegraph Co. has authorized an expenditure of $30,000 at Lake Charles for improvements in the telephone system, according to Vernon Baird, district manager. Material for the improvements have been ordered and will be delivered as soon as the orders can be filled. As the result of this extension approximately 150 telephones will be installed in the city. Cables running to West Lake and Goosport will be replaced with new and larger ones. Cables will be extended on Hodges, South Ryan, South and other streets.

MICHIGAN

A meeting was held in City Attorney Lane's office, Bay City, for the purpose of considering the telephone situation. City Attorney B. B. Vincent and Commission Holcomb represented Saginaw, while Mayor Mundy and Mr. Lane represented Bay City. Discussing the conference Mayor Mundy said: "We have been reliably informed that Grand Rapids, Battle Creek, Lansing and other industrial centers are perfecting arrangements agreeable to both telephone companies interested whereby the territory of such cities will be handled by but one telephone company with a large saving to customers. I believe mutual arrangements can be made between the telephone companies in Saginaw and Bay City which will assure better service for thepublic and will be better for both companies. The Saginaw officials are all of the same opinion. Another meeting will be held in the near future to which the officials of both telephone companies will be invited to discuss the situation."

The sixteenth annual meeting of the stockholders of the Traverse Bay Telephone Co. was held at its offices in Central Lake. The following officers and directors were elected for the ensuing year: President, Theodore Guyer, Central Lake; vice-president, Leonard Armstrong, Alden; manager and secretary, R. L. Maron, Central Lake; treasurer, A. J. Dole, Bellaire; directors, Harry Warner, Rapid City; Herbert S. Peebler, Ellsworth.

The Michigan State Telephone Co. is planning removal of all telephone poles on the main business streets of Albion and placing the cables either in underground conduits or back of buildings, at an expense estimated at $30,000.

It is reported that about $100,000 is to be expended in appraising the property of the Michigan State Telephone Co.

An increase in the rate for business telephones is sought by the Shiawassee Telephone Co., of Perry, in an application made to the Michigan public utilities commission. The commission is asked to permit a raise from $12 to $15. The application covers party business telephones, $12 to $18; party residence service from $10 to $15, and stockholders' rates from $12 to $15.

Franz C. Kuhn, formerly supreme court justice of Michigan, has been elected president of the Michigan State Telephone Co., succeeding Bernard E. Sunny, of Chicago, resigned.

NEW YORK

A movement to unionize the 12,000 telephone operators in New York City was launched yesterday by Miss Teresa Sullivan, vice-president of the Telephone Operators' Union, of Boston. She will be aided by 50 field workers from Boston.

At the annual meeting of the stockholders of the Hope and Hartsville Telephone Co. the board of directors was reorganized with the following members: George W. Dorrel, Scott W. Dorrel and Harris Dorrel. Following the reorganization of the board of directors the board held a meeting and elected the following officers: President and manager, George W. Dorrel; secretary, Scott W. Dorrel, and treasurer, Harris Dorrel.

NORTH CAROLINA

C. R. Craven, who for the past two years has served as cashier for the Southern Bell Telephone Co.'s Greenboro office, and who has been acting manager since the transfer to Charlotte of S. D. Lucas, has been perma-

nently appointed as manager for the company at Greenboro, effective March 1. Mr. Lucas, the former manager, was transferred several weeks ago to Charlotte as division cashier. Mr. Craven, who is a native of Davidson county, came to Greensboro in 1912, and was with the Southern Express Co. several years. Later he was with Bradstreet's, and he became connected with the Southern Bell Telephone Co. in January, 1918.

OHIO

The Lima Telephone Co. asked bids for a three-story addition to its building to take care of the business increases. It is to cost $70,000. When completed an up-to-date hospital and rest room will be installed.

Testifying to alleged financial straits of the Central Union Telephone Co. in Ohio, President E. S. Bloom, of Chicago, told the state public utilities commission at Columbus that the net earnings from the company's Ohio properties during the last six months of 1919 were only $145,000. He declared the net earnings for 1919 were only one-eighth of one per cent and that during 1918, the company operated its various exchanges at an actual net loss of one-ninth of one per cent. Mr. Bloom was testifying at the hearing on the company's application for increased rates in Columbus, Springfield, Zanesville, Sandusky, Youngstown, Akron and Dayton.

Proposed Bell telephone rate increases in Columbus and seven other Ohio cities, to have been effective March 1, were deferred until April 1. This action was taken by the company to give the utilities commission longer time to examine testimony in recent hearings.

Dayton people who have followed the case of the Central Union Telephone Co. in its endeavor for increased rates will be interested in the new angle of the situation brought out by City Attorney Scarlett, of Columbus, in a contention filed with the state utilities commission that telephone companies should be compelled to meet franchise agreements. The commission, Scarlett sets forth, according to a Columbus dispatch, permitted the company to charge the government rates as an emergency measure while the valuation of the property was being completed, instead of reverting back to the former rates when the lines were turned back to their owners by the government

The Van Wert Home Telephone Co. has awarded to the Automatic Electric Co., of Chicago, a contract for the installation of an automatic telephone exchange in the new building that is now being constructed by the local company. The contract price is about $100,000, and the contracting company will take over the present automatic exchange that is now in use.

Work will start immediately on the three-story brick addition to the Lima Telephone and Telegraph Co.'s exchange, South Elizabeth street, near Market, according to General Manager George H. Metheany. The contract has been let to E. W. Mumaugh, general contractor. The improvement, including heating, plumbing, wiring and material for construction, will cost approximately $75,000. The addition is to conform to the present architecture of brown brick and terra cotta. When completed the building will provide more room for the office force and operating department. It is planned to have a hospital for possible emergency cases among operators. The company has close to 11,000 telephones in service.

Hearings are being held by the state utilities commission relative to the rate increases proposed in various Ohio cities by the Central Union Telephone Co. Among the cities which have filed protests against the proposed increased rates are Dayton, Akron and Springfield. The commission will conduct hearings on all these protests. T. E. Green, telephone expert for the state utilities commission, took the stand in rebuttal to the claim of the officials of the telephone company that many of their exchanges are operating at a loss.

More than 500 interested visitors passed through the new plant of the Central Union Telephone Co. at Findlay on February 20, in response to the invitation issued by E. M. Staples, general manager. A. J. Mellen, of Toledo, district manager of the company, and W. G. Palmer, district plant chief, of Toledo, were present to assist in explaining the various complexities connected with the working of the plant.

At the annual meeting of the stockholders of the Newark Telephone Co. on February 23 the following officers and directors were elected for 1920: President, C. H. Spencer; vice-president, E. T. Rugg; secretary, Charles E. Hollander; treasurer, W. S. Weiant; directors, Joseph N. Pugh, Harry Swisher, Judge Robbins Hunter. The Newark Telephone Co. was organized in 1894 and began service in April twenty-five years ago. It is now a $600,000 organization with 350 stockholders. The exchange started with 200 subscribers and today has 7,750 subscribers. During the past year this company purchased the Bell exchange and as soon as equipment arrives the two exchanges will be consolidated, giving automatic service to all subscribers. Manager Hollander reported that the delivery of the equipment needed to effect the merger is promised in March, and as soon as it arrives the physical connection of the two exchanges will be made.

Public protest has been filed and city officials are opposing a proposed increase in rates asked for by the Bell Telephone Co. in Dayton. W. H. McConnaughy, the city attorney, recently appeared before the state utilities commission in Columbus, in connection with the application.

Bids were recently asked on a three-story addition to the Elizabeth street exchange of the Lima Telephone and Telegraph Co. to measure 27 feet in width and 76 feet in length, to be erected at a cost of approximately $70,000. The new building will conform to the present architecture of the old one of brown terra cotta and brick. It is expected to start construction at once. A feature of the new building will be a hospital for operators, presided over by competent nurses. The size of rest rooms will be increased when the building is completed.

The Citizens' Telephone Co., of Covington, has 94 unlisted subscribers in Kenton county, according to a list submitted by M. T. McBurney, assistant manager of the Bell Co., of Cincinnati, in the Circuit Court, and in the presence of the Kenton county grand jury. The jury was probing for evidence connected with handbook gambling.

Directors of the Chamber of Commerce of Youngstown decided not to oppose the proposed increase of telephone rates, application for which has been made by the Central Union Telephone Co. to the Ohio public utilities commission. Figures showing the company's condition were submitted by General Manager E. A. Reed, of the company's Columbus headquarters; District Manager Bradford, of Akron, and Manager I. E. Spankle, of Youngstown. They reviewed the entire telephone situation, claiming that under present costs even with the increase asked, the business in Youngstown would still show a deficit.